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GENERAL NEWS SECTION

*Illustrated.

WHATEVER the reason assigned for not paying employees in cash—whether it be that it necessitates running extra trains over the road, the employment of highly paid paymasters, the interference with employees' work, or the danger of handling large amounts of cash out on the road—the underlying and controlling objection is based on the dislike of operating men to interference from the treasury department. It was this desire to get rid of annoyances that has led many roads to change from a system of payment by cash to a system of payment by check. The treasury department itself has been largely responsible for this distrust of its methods. On the Pennsylvania Lines West this prejudice and dislike have been almost entirely overcome simply through a common-sense policy of co-operation which the paymasters have pursued. In working out

the system that is being used on these lines and which is described elsewhere in this issue, the co-operation of the division superintendents was sought and obtained, and the result has been that employees are being paid not only in a manner that is satisfactory to the treasury department, but also to the operating department and to the employees themselves. There is no more complicated network of lines in the country than those of the Pennsylvania Lines West, and it probably required consistent thought and effort and a great deal of patience to lay out the routes and times of payment in such a manner as to interfere least with the employees' work and with the regular operation of trains. Whether or not the effort and the patience required are too great a price to pay for the advantages of the cash system of payment is a question that each general manager has to decide for himself. If, however, he is willing to expend the effort and patience, the experience of the Pennsylvania has demonstrated quite clearly that it is entirely possible to pay all classes of employees in cash promptly and entirely satisfactorily.

THE method of dealing with attachments and liens against employees' wages illustrates possibly better than anything else can the spirit which lies behind the system of paying employees in cash on the Pennsylvania Lines West. There is nothing in the law of any of the states through which these lines run which would compel the railroad company to notify an employee of an attachment obtained on his wages. It would be easy to argue that employees should not run into debt and that a man who had his wages attached was not deserving of consideration. This is not the argument that is accepted in regard to employees on the Lines West. The railroad company goes to considerable trouble and some expense to notify a man whose wages have been attached of the fact and he is advised to consult at once with the nearest company's solicitor. Men are not permitted to make an assignment of their wages. If a man urgently needs money before the end of the month, it is possible for him to obtain it from the railroad company. In dealing with loan brokers the company advises its men to make a tender of the amount due, with legal interest, and if the loan broker refuses this tender, the company assumes the burden of paying the employee the wages due him and fighting the case, if necessary, against the broker. It was at one time the practice to discharge a man who was found to be in debt to a loan broker, but this had the effect of helping the loan broker. A Pennsylvania employee was considered a preferred risk simply because after he had once gotten in the grasp of the money lender the severest possible pressure could be brought to bear to compel the payment of any interest, no matter how exorbitant, through the fear of exposure. Now this fear has been removed and the employee who has been unfortunate and has gotten himself in trouble can feel that the company is his friend rather than the money lender's instrument of vengeance. Of course the man who habitually gets in debt is not a desirable employee and is not retained. The attitude in regard to money lenders and attachment of wages for bills is only one of a number of ways in which the company is making a consistent effort to gain the loyalty of its employees through a consideration for their convenience in the matter of receiving their wages that, it would seem, is bound to have a very considerable effect.

IN his paper on Freight Car Tactics, which was published in our issue of January 24, Arthur Hale spoke of the box car as a legal-tender car, because it may be interchanged generally by the railroads and used for transporting practically any kind of commodity. In the discussion of this paper at the annual meeting of the Central Railway Club, attention was directed to the fact that although the American Railway Association has established standards as to the size and capacity of such cars, nothing has been done towards the establishment of standards for their physical condition. A little less than a year ago we called attention in a series of articles on Defective Box Cars

and Damaged Freight, to the fact that an extremely large proportion of the box cars had roofs, sides or ends which allowed moisture to leak through into the car and thus unfitted it for safely transporting such commodities as flour, cement, grain, etc. Very many of the cars have defective sides, ends or floors which allow grain or similar material to leak out and can only be prepared for transporting such materials safely by going to considerable expense, which must be incurred as often as the cars are used for such service. It was suggested, therefore, that if box cars are to be considered as legal-tender cars there are a great many counterfeits in circulation. Such a large proportion of the merchandise transported in box cars can be damaged by these defects that it would seem advisable for the American Railway Association to outline certain physical conditions which must be complied with in order that the cars may safely be used for such purposes, and then that some distinction be made between the cars in 100 per cent. condition and less, so that the poor cars can be discriminated against, thus forcing the roads that own them to put them in better condition. Two causes are responsible for the cars being in defective condition. Either they were poorly designed or constructed, because of ignorance or a desire to save money in the first cost, or they have not been properly maintained. In the first case it would be necessary to spend considerable money in rebuilding and placing them in proper condition, but this would probably be saved many times over before the cars became useless, by the reduction in the expense of maintenance and in the damage to the lading. The second cause would, of course, be overcome by seeing that proper attention was given to the maintenance of the cars. As a rule this has always resulted in a net decrease in the total cost of maintenance over any given period of time. In the interests of efficiency and economy of the individual roads and the railroads at large some steps should be taken toward keeping the legal-tender cars in 100 per cent. condition. It would prove to be no small task, but in the end would undoubtedly be a wise and far reaching investment.

AN EXAMPLE OF GOOD REGULATION.

THE report of the New York State Public Service Commission on the Corning collision, noticed in the *Railway Age Gazette* of January 17, page 105,* embodies such an excellent treatment of its subject that it may be said to mark a decided advance in governmental efficiency in the matter of safety on railroads. Our forty-three state commissions have made very slow and irregular progress in their function of correcting the neglect of railways, and the activities of the federal government in the same direction have been characterized by many and serious mistakes, though producing at the same time some beneficial results. In the case of the state governments the responsibility for inefficiency may be traced quite directly back to the voters, for the most of the weakness of state bodies has been due to the employment of the elective system, instead of having commissioners appointed; too short tenure of office, low salaries and the evils incident to adherence to political instead of business principles. But in the Corning report we see the fruits of the course opposite to this; a shining example, in fact. The voters of the state of New York had seen the evils of corrupt government so clearly that in 1906 they chose, as governor, Charles E. Hughes, incorruptible, farsighted and thoroughly public spirited. Mr. Hughes, in selecting men for the public service commis-

sions, got the very best men that he could find available, and in this he was aided by a law providing much better salaries than are usually allowed for commissionerships. One of the five commissioners at Albany is a mechanical engineer with railroad experience. The commission, in selecting its inspectors, also sought men of railroad experience, judicial temperament and fitness for the several kinds of work to which they were assigned. Both the governor and the commission had a good degree of success in their quest for competent men; so that we have here an illustration of how very simple are the means and methods needed for good government when men wholly devoted to the public interest follow persistently a rational course.

The Corning report may almost be called an essay on safe train-running. Not the least of its merits is the lucid arrangement, secondary matters being put in their proper secondary place. "The question of supreme importance is how to prevent accidents," rather than merely to minimize the effect of the accidents. Every state railroad commissioner will find profit in reading this report a second time. The paragraphs addressed to the brotherhoods lay down the law—the moral law—in no uncertain terms. That many employees in all departments (thoughtlessly or otherwise) habitually shield fellow employees who are careless or incompetent, is all too well known. That a brotherhood which formally declares adherence to high ideals is bound to take vigorous action to repress every kind of conduct which violates those ideals is a solemn truth; and the Commission does a valuable public service in so frankly calling attention to these conditions.

On the main issue, discipline of employees, the report goes at once to the normal starting point; that is, the offices of the assistants to the superintendent, on whom devolves the immediate responsibility for discipline. There is no possible substitute for strong men in these positions. These officers must not only be strong—"capable of dealing justly and fearlessly"—but they must feel secure in their places. It will not be out of place to add, what has been said in these columns many times, that these men, like the division superintendent, should be kept in one place long enough to give the position the benefit of the incumbent's individuality, and the knowledge and ability that depend on this. Too frequent promotions may be almost as injurious as too frequent changes for other causes. All this implies the need of better salaries, of course.

This part as well as much of the rest of the report, is in general terms, and evidently is intended to apply not alone to the road on which this collision occurred. The commission has been studying the conditions very carefully throughout the state of New York for five years. Moreover, the writer of the report recognizes, as a practical matter, whatever theorists might say, that roundhouse foremen, trainmasters and road foremen cannot surely be depended on to reform themselves; he addresses himself to the higher officers: "There should be greater care in the selection," etc. Again, we read: "Managers and superintendents should enforce discipline at any cost." This phrase—"at any cost"—is a reminder of the fact, known to all operating officers of the larger roads, that rigid discipline, which is absolutely fundamental in such an exacting business as running express engines, is costly, in more senses than one, and that if it is to be administered successfully it must be reasonably uniform on all of the divisions of a road.

As has been suggested, a main purpose of this editorial is to make readers want to go over that report a second time. We shall not take the time to enlarge on all of the points which merit commendation. Not the least of these is the declaration that the main reliance (for protection against rear collisions) must be on the fixed signals; that we put too much dependence on the flagman and his uncertain methods. We ask of him impossible things. The exposure of the utter baselessness of Schroeder's explanations and excuses is another point of interest. Many investigations are deficient in this feature. The commission holds that questions of steel cars and fire dangers call for much in-

*The full text of the report, which has since been issued, contains a number of photographic illustrations showing the situation at the place where the collision occurred, and also showing the damage done to the steel cars. The commission, in discussing the condition of engineer Schroeder on the morning of the collision concludes that the fear that Schroeder was not fit for his duties was the reason why the fireman was in the engineer's cab; the explanations given by the fireman attributing some other reason, or reasons, are believed to be entirely inadequate. Inspector Buchanan, in his report, discusses the question of having a third man on the locomotive to make sure that a good lookout shall be kept. He decides against that proposal; and adds that inquiry from the larger railroads indicates that the "Mother Hubbard" type of engine is being eliminated from future plans.

vestigation before any governmental action would be warranted. We need not enlarge on the difference in the tone of this paragraph as compared with that which pervades the discussions on this subject in some other quarters—before the House Committee at Washington, for example. Indeed these New York Commissioners are in some respects so cautious and conservative that if they were in the position of the Commerce Court they would be in imminent danger of having their heads cut off!

SOME MORE REASONS WHY RAILWAYS ARE UNPOPULAR.

THE railways of the United States are more popular than a few years ago. They are so because they have set out to make themselves so. They have tried to popularize themselves by correcting things that are wrong and remediable in their service and rates, and by explaining things that merely seem wrong or are not remediable. But the roads are not nearly so popular as they want to be, and ought to be for their own good and the public's. This is largely because there still exist conditions that need to be changed. More people come in contact with railways as passengers than in all other ways. The way passengers are served, will, therefore, make a road more "boosters" or critics than anything else. And the way passengers are still treated by the roads and their employees in many instances makes thousands of critics.

This paper published a few years ago (*Railway Age Gazette*, November 19, 1909) an article entitled "Some Reasons Why Railways are Unpopular," in which were given specific examples of the sort of shortcomings of the railways or their employees we now have in mind. Recently many roads have conducted campaigns among their employees on the subject of consideration for and courtesy to passengers. In many passenger cars and stations, placards are tacked up stating that the managements desire their patrons to be given every reasonable consideration and attention, and asking patrons to report to headquarters all cases of incivility, etc. These things have had a wholesome effect. But it is still true that a large part of the employees who deal with passengers are not as civil as they ought to be and that many are careless or incompetent.

Furthermore, there are serious defects in the passenger service of numerous roads which the managements alone can correct. This is especially true on branch lines. One of the most serious shortcomings is the glaring disproportion between the amount of attention given and money devoted to providing through passenger service and local passenger service. When we observe the kind of local service given on most branch lines and on many main lines we do not wonder that public sentiment in communities outside the cities often becomes hostile to the railways or that the people of these outside communities often encourage the development of electric interurban lines and flock to them when they are opened.

Take, for example, the difficulty that people at towns and small cities often meet in getting proper sleeping car accommodations. Our experience has been that in most cases when the agent at a country station is asked to wire reserving a lower berth he fails to do so, and the passenger has to take an upper berth, or gets none. The passenger in that case criticises the railway management. Why shouldn't he? The agent represents the management; and the management is properly held responsible for his faults of omission and commission. Here is a specific instance which illustrates what often happens: A traveler going from a good-sized city to a small town had to change trains at 3:30 o'clock a. m. He asked the ticket agent at the point of origin to telegraph for a lower berth for him on the train to which he was to change. When this train came in he hurried, carrying two heavy pieces of baggage, toward the rear where the sleeping cars were. None of the doors of the sleeping cars was open; and he had to carry his baggage back to the chair car and go through the train back

to the sleeping cars. He finally found a porter who was awake, but who knew nothing about his reservation. The ticket agent should have wired for the reservation, but apparently did not. And the doors of at least one of the sleeping cars should have been opened, anyway; for the rules require this at every station where a stop is made. In this case complaint was entered, and both the railway management and the Pullman Company took prompt action.

Here is another experience of the same traveler: Desiring to leave New York for Chicago he telephoned for a drawing room on a through sleeping car operating over two lines connecting at Buffalo. When the ticket was delivered it was not for a drawing room, but a section, and it was returned. Then the ticket agent said that the drawing room could not be reserved until the next morning, one hour before the time for the train's departure. Repeated inquiries as to why at last elicited the information that the agent was preparing to sell the passenger a drawing room on a car that went to St. Louis, in consequence of which, without previous warning to him, he would have had to change cars at Buffalo. Naturally, he got angry and went by another route. And if he had gone the way he originally planned and had found he had to change at Buffalo, he naturally would have been indignant. Think of such things happening in connection with transportation between two such points as New York and Chicago!

Recently an eastern business man who was traveling from one end of the continent to the other reserved a drawing room from one of the large interior terminals to the Pacific Coast. When he got on the train he found the same drawing room had been sold to other persons who were in possession of it and refused to give it up. He stood on his rights, insisted on having a drawing room, and the railway had to put an extra sleeping car on the train and haul it 2,400 miles. That was pretty expensive for the railway. But who ought to bear the expense and annoyance caused by the carelessness or incompetency of railway employees?

The dining car service of the railways of the United States is the best in the world. But things occasionally happen in dining cars that are enough to try the soul of patience. There is a certain railway president who has a disconcerting way of turning up in unexpected places. He turned up for breakfast at 7:30 o'clock one morning recently in a dining car on one of his own trains. He found the car cold and unclean, the cooking poor and almost every feature of the service unsatisfactory. When he finished breakfast he called the dining car conductor and told him to hand in his resignation at the end of his run. The astonished conductor asked for an explanation. The president replied that if that morning's service was a sample of what was being given on that car, and the conductor did not know why he should resign, that was a conclusive argument for discharging him. The result was that the conductor was not discharged, but that he became a chastened and a more efficient employee. Railway presidents and vice-presidents are mighty busy men. They haven't time to become regular inspectors of dining car service. But the spreading of the news of a few incidents like that over a railway helps a lot.

A short time ago a man and his family had to travel across country on local trains from a station on one main line of a certain railway to a station on another of its main lines. The distance was relatively small, but the circumstances were such that, carrying a good deal of hand baggage, they had to change trains several times. When the ticket agent at the point of origin sold their tickets he said they would have to make three changes and would arrive at their destination at 6 p. m. When they reached the point where they made the third change they found that they would have to make still a fourth change farther on and that instead of reaching their destination at 6 p. m. they would reach it almost two hours later. The agent at the point of origin, without looking the matter up, had carelessly assumed that they would catch a certain train at the

point of their third change, when in fact that train was regularly scheduled to leave one hour earlier than their train was scheduled to arrive. There is a good deal of difference between making three expected changes of trains and four changes, one of which is unexpected, and between arriving in a strange place at 6 p. m. and at 8 p. m. A ticket agent who will sell tickets over such a route without making absolutely certain that he is giving passengers correct information is careless or incompetent. And every man who travels much as an ordinary passenger can testify from his experience that such things happen every day on railways all over this country.

We propound the following conundrum: Why is a station bulletin board? Theoretically, its purpose is to give information to passengers regarding the time of arrival and departure of trains. In practice, the number of bulletin boards at country stations that regularly give correct information is small. And when at 9:30 a. m. the waiting impatient traveler, noting that his train is bulletined to arrive at 9 a. m., inquires of some station employee when it will be along he will in a majority of cases get a curt answer. The answer may not be curt enough to make the basis of a complaint to the management, but it is likely to be quite curt enough to give the inquirer a feeling of resentment that will later manifest itself in some form of antagonism to the railway.

Speaking of bulletin boards brings to mind our old friend, the late passenger train. The muck-raking author of an article in one of the current magazines greatly exaggerates the proportion of late trains in this country and makes their lateness the basis for some bitter and unjust criticism of the managements of American railways. But the facts are, that many trains in all parts of the country are late; that while there are good explanations of this condition there is no good excuse for it, and that it does furnish a good text for muck-raking the roads. The best management of the best railway cannot prevent trains from being late occasionally. Any good management can keep them from being late chronically. If a road's trains are chronically late it is a sure sign either that the published schedules are too fast, or that there is not enough effort made to keep trains on time. If the published schedules are too fast, the only fair way to treat the public is to lengthen them. If the schedules are not too fast, they can ordinarily be maintained.

The main cause of late trains is unnecessary delays at stations. The employees of the roads, of the express companies and of the postoffice department often fail to plan for putting their traffic on and off the trains promptly; they often move with leaden feet while putting it on and off; and in consequence often a train departs late. When one train—especially on a single track line—leaves a station late, the first step has been taken toward demoralizing the whole train service, if the lost time is not made up at once by fast running; and if it is attempted to make it up by fast running there is likely to be an accident that will cause more and greater delays if not something worse. The speed of trains should be strictly regulated according to the character of track and equipment; and such regulation could be carried out and trains ordinarily kept on time if more were done to reduce the many needless delays at stations. Numerous trains that make long through runs and arrive on time at terminals arrive late at many intermediate stations. Every time a train arrives or departs late at any place it makes critics and enemies for the roads. Are critics and enemies so much more to be desired at intermediate places than at terminal points.

There are many roads that make great efforts to keep their trains on time; but there are so many through sleeping car routes over connecting lines that the better managed and equipped roads have to share the odium caused by the shortcomings of their weaker brethren. When will the managements of all American railways get the courage to make slow schedules for slow trains or exercise the necessary supervision

to keep all trains on time except under extraordinary conditions? And how can any management hope to make its railway really popular with its patrons until it regularly does what it promises to do and what they pay it for doing? Some of the state railway commissions recently have been agitating regarding this matter of late trains and threatening to bring suits to have the roads heavily fined for not maintaining their schedules. Can any one say that the public and public officials have not a right to complain when trains are chronically late?

The incidents and conditions mentioned all point to the need for more and better supervision of station and train service. This better supervision should begin with the selection of employees, it should extend over their training, and it should include incessant inspection and disciplining in order to make sure that they are doing, and will do, what they have been instructed to do and what the rules require them to do. This need for more and better supervision is, of course, much greater on some roads than on others. But it exists more or less on practically all. Most of the additional supervising could be done by the present officers if they would constantly keep their eyes open for defects of service and promptly apply the obvious remedies. One trouble is that many railway officers are so used to the existence of conditions which annoy their patrons that they actually do not notice them. Another trouble is that the very fact that a man is an officer of a railway prevents him from seeing some things that others see because employees are all on their good behavior when he is about. Also, there is a considerable number of men in official positions on railways—as in all other businesses—who have got into ruts and lack the energy or disposition to get out of them and do things that they haven't been used to doing. All of these classes of officers need an awakening as a necessary prerequisite to the awakening of the employees under them. Probably in order to get adequate supervision of station and train service most roads would have to incur some additional expense. But isn't it worth while? There is no better asset of a business than pleased patrons; and there is no worse liability than disgruntled patrons.

NEW BOOKS.

Traveling Engineers' Association. Proceedings of the twentieth annual convention. Illustrated. Bound in leather, 410 pages, 6 in. x 9 in. Published by the Traveling Engineers' Association, W. O. Thompson, Secretary, Buffalo, N. Y. Price \$1.50.

At the last convention of the Traveling Engineers' Association, held in Chicago, August 27-30, 1912, a number of the more important and interesting problems in connection with locomotive and train operation were presented for discussion. In each case the author of the paper, and especially the members discussing it, approached the subject with the evident intention of obtaining the greatest benefit possible in the time at their disposal. In consequence both the papers and the discussions were most valuable. They are given complete in the proceedings. The committee on subjects wisely provided but six topics, as follows: Benefits to be derived from chemically treated waters in connection with the increased efficiency of locomotives; Fuel economy and the relation of mechanical appliances, such as superheaters, mechanical stokers, brick arches and the handling of trains; Handling of long passenger and freight trains with modern air brake equipment; Inspection of locomotives and form of work reports that should be required of engineers on arrival at terminals; How to interest enginemen in the economical use of fuel and lubricants, and the advantages and disadvantages of lead on modern locomotives. The volume includes a copy of the constitution and by-laws, a list of members with their addresses, and a list of the subjects presented for discussion at each of the previous conventions. The subjects which will be presented at the 1913 convention are also given.

LIFT BRIDGES OVER THE BUFFALO RIVER.

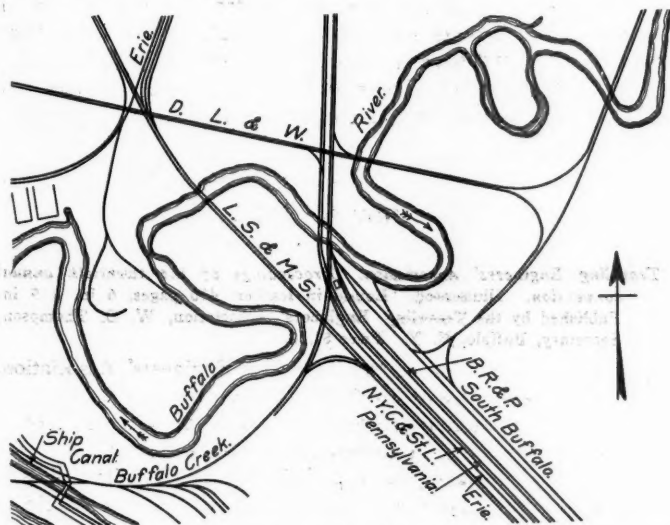
The Construction of Three Movable Bridges Replacing Fixed Spans to Allow Navigation of a River at Buffalo.

By EMILE LOW.*

The main harbor of the city of Buffalo comprises the Buffalo river and the City Ship canal, the former a natural stream, and the latter an artificial waterway. From a stream originally less than 10 ft. deep, the Buffalo river has gradually been deepened by dredging to 23 ft. below mean lake level, this depth now being available at the Lake Shore & Michigan Southern bridge. A contract for deepening the river to 23 ft. above this bridge has been let to the Great Lakes Dredge & Dock Company, Chicago, and in order to utilize this section for navigation and industrial purposes, movable bridges are being substituted for the present fixed spans. Work is now in progress on three railway bridges used by five roads, the Lake Shore & Michigan Southern, the New York, Chicago & St. Louis, the Pennsylvania, the Buffalo Creek, and the Buffalo, Rochester & Pittsburgh.

LAKE SHORE & MICHIGAN SOUTHERN BRIDGE.

The previous crossing of the Lake Shore & Michigan Southern comprised two fixed spans of 110 ft. each. As the new bridge is to occupy the site of the old one, a temporary double track pile bent trestle with three plate girder spans was built south of and parallel to the old bridge. At the bridge crossing, solid limestone is found at an elevation about 36 ft. below mean water level. The abutments rest on pile foundations, 30 ft. piles being driven to rock. The substructure comprises two abutments, A at the west end and B at the east end, and four piers Nos. 1, 2, 3 and 4. The substructure is of 1:2½:5 concrete. The entire



Location of Three New Movable Bridges Over the Buffalo River.

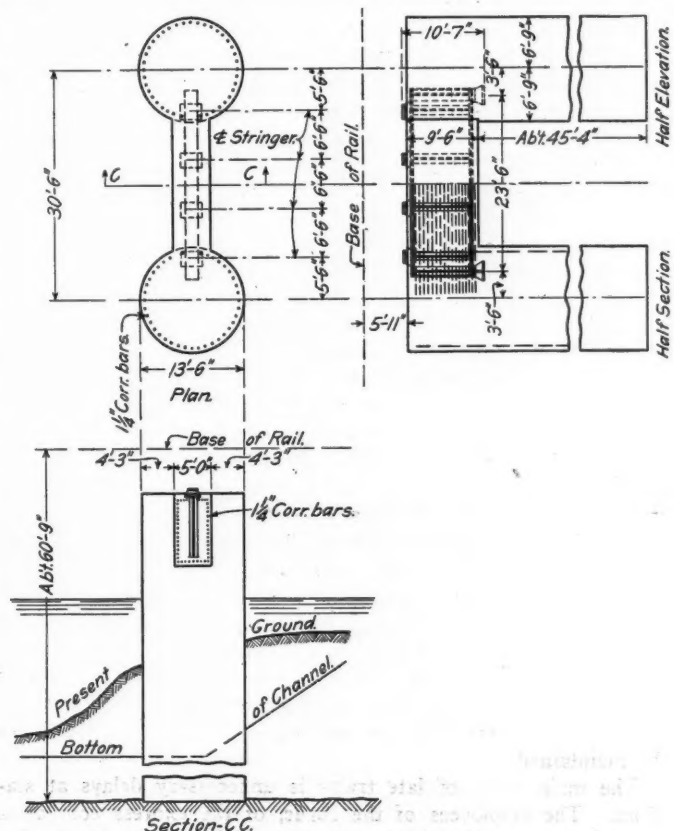
structure with the exception of the steel work is being built by company forces.

The following table shows the approximate estimate of materials required in the foundation:

	Concrete.				Reinforcement.			
	Total Cement Sacks	Co- ment Cu. yds.	Broken Stone Cu. yds.	Piles	¾ in. sq. Lin. ft.	1 ¼ in. sq. Lin. ft.	Cross Gird- ers	Cast- ings
West Abut. A.	390	2,030	180	360	80	760		
Pier 1	590	3,070	270	540	260	6,480	1	2
Pier 2	590	3,070	270	540	260	6,240		4
Pier 3	620	3,225	285	570	260	6,240	1	2
Pier 4	620	3,225	285	570	260	6,240	1	2
East Abut. B.	370	1,925	170	340	75	760		
Total	3,180	16,545	1,460	2,920	155	17,800	3	6

*Consulting Engineer, Buffalo, N. Y.

The two abutments are of the U type, with battered front faces and vertical backs, abutment B being at right angles to the center line, and abutment A having a skew of 79 deg. 16 min. 38 sec. The respective heights are 28 ft. 3½ in., and 27 ft. 8¼ in. Abutment B has 75 supporting piles in 5 rows of 15 each. The foundation course is 15 ft. 6 in. wide, 38 ft. long and 4 ft. 6 in. high. The height of the retaining wall above the foundation



Details of Cylinder Piers for Lake Shore & Michigan Southern Bridge.

course for abutment B is 23 ft. 9½ in., and the bottom thickness, 12 ft. 6 in., a little less than half the height. The U stems are very short, only 4 ft. The embankment will spill around the abutments in the usual manner. The only reinforcement in the U abutments is in the foundation course, there being 76 corrugated bars, ¾ in. sq. and 10 ft. long, spaced 6 in. center to center. The piles project into the foundation course 12 in., and the corrugated bars are laid in a row 3 in. above the tops of the piles.

The piers are concrete cylinders in pairs. Piers 1 and 2 are on a skew of 79 deg. 16 min. 38 sec. from the center line. Piers 3 and 4 are at right angles to the center line. The height of the cylinders varies from 51 to 52 ft., owing to the variation in the level of bed rock. The diameter of the cylinders is 13 ft. 6 in., and the distance between their centers is 30 ft. 6 in. at right angles to the center line. The cylinders are connected at the top by reinforced concrete girders or struts, 9 ft. 6 in. deep. The width for pier 1 is 5 ft. 6 in., and for piers 2, 3 and 4, 5 ft. The reinforcement for each cylinder consists of 80 corrugated bars, 1¼ in. square, 30 ft. long, placed vertically in the periphery and 6 in. back from the face. The spacing is approximately 12 in. center to center. In addition, the tops of the cylinders of

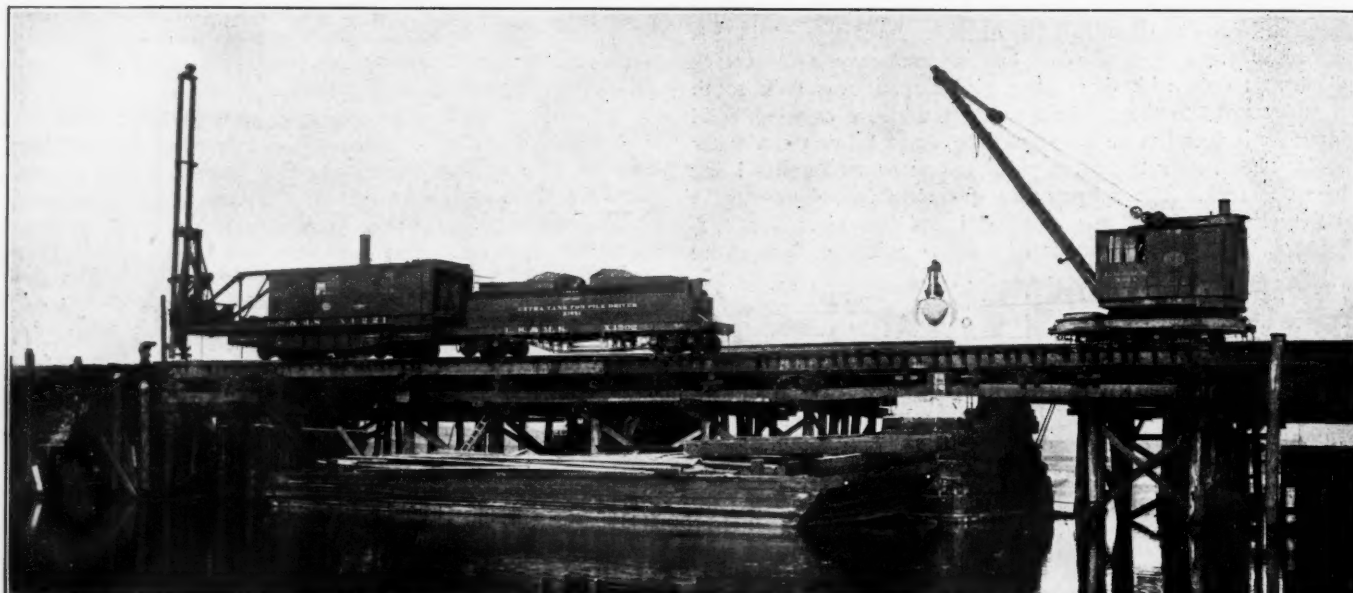
pier 2 are reinforced by 52 corrugated bars $\frac{3}{4}$ in. square, 5 ft. long, placed vertically in the line of the diameter and at right angles to the center line.

The strut connecting the cylinders of pier 2 is reinforced by 48 corrugated bars, $1\frac{1}{4}$ in. square, 30 ft. long, placed 6 in. from the side and bottom faces and 12 in. below the top faces. The spacing is about 6 in. center to center. The struts in piers 1, 3 and 4 contain an imbedded steel plate girder. Pier 1 contains 56 corrugated bars, $1\frac{1}{4}$ in. square, 30 ft. long and piers 3 and 5 have 48 bars of the same dimensions. The plate girders are 25 ft. long and 8 ft. high, and rest on cast iron pedestals imbedded in the concrete at the proper elevation. The plate girders also carry the pedestals supporting the superstructure.

The cylindrical piers were constructed inside circular cofferdams composed of Lackawanna arched-web steel sheet piling. The light section was used, each piece building 14 in. of wall, and weighing 35 lbs. per sq. ft. of wall. The weight per lineal foot of piling bar is 40.83 lbs. Each cylinder, 18 ft. in diameter, consisted of 50 sheet piles, each 45 ft. long. To furnish a template or guide for driving the cylinders, five wooden piles were first driven, one in the center, and four at the corners of an inscribed square. Diagonal braces connected the circumferential piles, crossing at the center pile. A circular wooden frame or

tached to the top of the first one. A second ring or frame was then laid on top of the posts of the first one and both were driven down by the pile driver. This procedure was repeated until five frames had been driven in place, the lowest one being stopped about 5 ft. above bedrock by the remaining material. The cylinder was then pumped out and the remaining material down to bedrock removed in large buckets. Octagonal forms were then built inside the cylinders, resting on the bedrock, which were filled with concrete dumped into vertical chutes reaching to the bottom.

After the foundation had been placed, the lower frame was removed and another course of concrete added, octagonal in cross-section as before. At an elevation of about 21 ft. below the completed top of the cylinder (or about 5 ft. below water level) the cross-section was changed to a circle. The octagonal forms were left in place. The forms for the upper parts of the piers were built at Collinwood, Ohio, near Cleveland, and consisted of staves 10 ft. 6 in. long held in place by three hoops. To prevent deformation during transportation and handling, temporary rings were placed in the interior which were removed after the forms were placed in position on the octagonal foundation courses. The forms were built similar to a water tank, but without a bottom. There were 100 staves in each, each



Track Pile Driver and McMyler Derrick With Orange Peel Bucket; Lake Shore & Michigan Southern.

ring, 6 in. deep, and made up of three layers of 2 in. lumber was then attached to the top of the piles, around the outside of which the steel sheet piles were driven.

The steel sheet piling was driven by a revolving pile driver mounted on a suitable car body or frame. A special tender accompanied the pile driver, supplying water and fuel. The enclosed material in the steel cylinders was removed by an orange peel dipper operated by a revolving derrick, mounted on a car, the excavation being completed while the cylinder was filled with water. Owing to the hardness of the material immediately overlying the bedrock, a layer of several feet in thickness had to be left in for future removal.

The next work was to brace the interior of the cylinders to prevent collapse when the water should be pumped out. This was accomplished by building heavy circular frames or rings of timber made up of two courses of old 9 in. x 18 in. stringers, bolted together. The frames were 17 ft. 6 in. in diameter, with a central opening 10 ft. 6 in. square. Four hook eyes were placed at the corners of the square for handling.

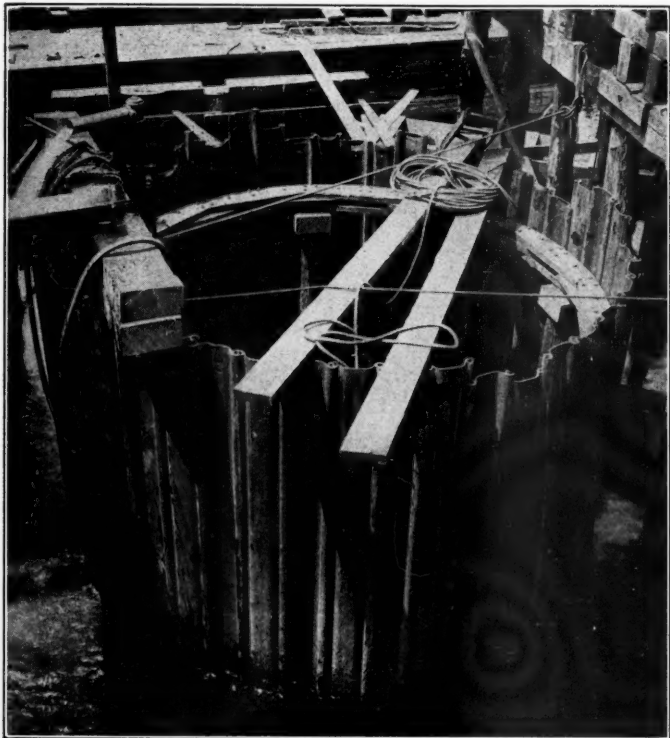
These heavy frames were placed in the cylinders by the revolving derrick, large vertical posts, about 5 ft. high, securely held by diagonal bracing or inclined struts, having first been at-

tached to the top of the first one. The diameter of the forms was 13 ft. 6 in., the same as that of the finished pier. Two forms in height were used, the upper one having suitable openings on one side to allow the placing of the steel plate and reinforced concrete girder connecting the upper portion of the two cylinders forming each pair.

The concrete mixing plant was installed on three flat cars. On one were built the storage bins for holding the sand and broken stone, with a platform for the cement. Another carried the inclined plane up which the loaded material car was run to the mixer, which was installed on a third car. The mixer is one built by the railway company and is a cylinder revolved in a vertical plane. It has two openings, opposite to each other and closed by hinged doors. The concrete materials are dumped into a chute above, dropping into the mixer; the door is closed and the mixer revolved a sufficient number of times; the lower door is then opened and the mixed concrete allowed to drop into a chute under the car and leading to the work. The concrete is made in large batches, the charging car having a capacity of about 31 cu. ft. Usually a batch contains 5 bags of cement, more being used for foundation work than above ground and water.

The sand for concrete was obtained from pits at Irvington, on the shore of Lake Erie, 28 miles west of Buffalo, and the broken limestone, partly from Kelley Island, in Lake Erie, near Sandusky, Ohio, and partly from Akron, N. Y., 22 miles east of Buffalo. The engineering department of the Lake Shore & Michigan Southern prefers broken stone to a natural mixture of sand and gravel, owing to the difficulty of securing a properly graded mixture.

The superstructure consists of a 50 ft. deck girder, a 112 ft. 6 in. through girder, a Strauss trunnion bascule bridge with a movable span of 131 ft. 6 in., and a tower span of 49 ft., and a 56 ft. deck girder in the order named going east, all spans being double track. The front end floor beam is on a slight skew,



Circular Cofferdam of Lackawanna Arched Web Steel Sheet Piling Showing Template Around Which Piles Are Driven; Lake Shore & Michigan Southern.

while the trunnion end of the bridge is of necessity square. One bottom chord is therefore slightly longer than the other, while the top chords are of equal length.

The bridge is operated by means of two pinions, one on each side, turning in bearings secured to the tower, which engage cast steel racks bolted to the operating struts. The operating machinery consists of two 50 h. p., a. c. motors connected to the operating pinions through a train of reduction gears and an equalizing gear. The motors are each provided with a solenoid brake, and one motor driven emergency brake, which is normally set, is provided. This brake is released by a motor, and is held in release as long as current is applied to this motor. Cutting off the current, or any failure of current will result in the instantaneous application of the brake. The emergency brake may also be released mechanically when the bridge is to be operated by hand. In addition to electrical operation, hand operation is also provided for. By means of hand cranks placed in the tower, the operating machinery can be actuated by two men. The operator's house is located on shore close to the bridge and contains the controllers for the leaf motors and other electrical apparatus and indicating devices.

The break in the floor between the fixed portion and the moving leaf is located in front of the main trunnion, and the live load, therefore, does not tend to open the bridge. Front end locks are provided, however, which hold the bridge firmly to

the rest pier. The movement of the latch bars automatically stops the motors and sets their brakes at each end of their travel. Hand operation is also provided for operating the locks in case of emergency. The operating and lock motor circuits are connected with the interlocking system, so that current is not available for operation until the signals have been set at "danger," and these signals cannot be set at "clear" until the bridge is closed and the locks driven in. In like manner current is not available for the leaf motors until the locks have been withdrawn.

An automatic cut-off is provided which will throw the circuit breakers out and cut off the current from the leaf motors and set their brakes when the bridge has reached the nearly fully open position. A foot switch is provided, which will enable the operator to release the motor brakes and allow the bridge to "coast" if desired. In closing the bridge current is available to hold the leaf down firmly on its seat until the locks are fully driven in. Mechanical indicators will be located at the pivot end and front end of the bridge, placed on the stationary and movable parts, so that they can be seen from the operator's house, and to which the operator can sight and thus determine the nearly closed and open positions of the bridge. Electric light indicators are also provided in the operator's house showing the operator the various positions of the locks and the bridge leaf. The movements of the locks and bridge itself open and close the circuits of these indicator lights.

This bridge was designed by B. R. Leffler, bridge engineer, and is being built under the supervision of G. C. Cleveland, chief engineer of the Lake Shore & Michigan Southern.

THE BUFFALO CREEK RAILROAD BRIDGE.

This bridge lies about 2,000 ft. southeast of the Lake Shore & Michigan Southern bridge, and about 100 ft. east of the



Interior View of Cofferdam Steel Sheet Piling With Timber Ring In Place for Bracing Against Water Pressure; Lake Shore & Michigan Southern.

bridge used by the New York, Chicago & St. Louis and the Pennsylvania. It consists of four spans, a Strauss bascule span 213.5 ft. long, two through plate girder spans, 89 and 88.5 ft. respectively, and one deck plate girder span, 38 ft. long, the total length between back wall faces being 429 ft. There are two abutments and three piers, abutment 1 and pier 2 being at right angles to the center line, and piers 3, 4 and 5, and abutment 6 having a skew of 54 deg. 53 min. 30 sec. The elevation of bed-rock is about 47 ft. below mean lake level.

The concrete piers are supported by bearing piles driven to bedrock. The piles of piers 2, 3, 4 and 5 are 25 ft. long, and of abutment 1, 30 ft. long. The foundation of abutment 1, and

piers 2 and 3, which support the Strauss bascule span, are spread considerably beyond the upper neat lines. The number of supporting piles is 140, 164 and 132 respectively. Piers 4 and 5 and abutment 6, contain 116, 96 and 40 piles.

The cofferdams were all built of Lackawanna steel sheet piling, straight web section, $12\frac{3}{4}$ in. x $\frac{3}{8}$ in., weighing 35 lbs. per sq. ft. of wall and 37.187 lbs. per lin. ft. of piling bar. The length used was 34 ft. It was usually driven 8 to 9 ft. below the bottom of pier elevation and allowed to project 3 to 4 ft. above water level, the depth of water ranging from 8 to 10 ft. The cofferdams were built 5 ft. wider and longer than the neat dimensions of the masonry. The steel sheet piling was driven by a two-ton drop hammer. The wooden supporting piles for the abutment and piers were driven with a steam hammer, weighing 4,500 lbs., with a 3 ft. fall. The material being soft, the piles were easily driven to rock. In abutment 1 and pier 2, the piles "heaved up" 3 ft. and had to be redriven two or three times. In pier 3, this heaving amounted to only $1\frac{1}{2}$ ft.

The new bridge occupies the same site as the old, which consisted of two 135-ft. three-truss double track iron spans designed for a load of 2,000 lbs. per lineal foot. To maintain the traffic, a double track pile bent trestle was built south of and parallel to the old bridge. A similar trestle to the north carries temporarily the traffic of the New York, Chicago & St. Louis and the Pennsylvania, the new bridge of the Buffalo Creek Railroad lying between. In excavating the material from within the cofferdams, the inside piles of both trestles settled as much as 6 in., the stringers requiring jacking up and readjustment. This subsidence was caused by the flow of the soft material, the piles of the temporary trestles depending wholly on skin friction, not being driven to bedrock.

The substructure consists of 1:3:6 concrete. The mixer was a



Cofferdam, 30 ft. x 60 ft., of Straight Web Section Lackawanna Steel Sheet Piling; Buffalo Creek Railroad.

Ransome, of about $\frac{3}{4}$ cu. yd. capacity, the usual charge being two bags of cement, 6 cu. ft. of sand and 10 cu. ft. of broken stone, the sand and stone being measured in wheelbarrows, gaged by known measures. The concrete in some cases was mixed on shore, run out in cars and dumped directly into the forms. In others it was deposited by buckets, and in others through chutes.

Abutment 1 and pier 2, which are built at right angles to the center line, have a foundation area of 20 ft. x 53 ft., and 24 ft. x 54 ft. respectively. Owing to the skew of the crossing, piers 3, 4 and 5 are longer, the foundation area being 18 ft. x 58 ft., and 14 ft. x 57 ft. respectively. The spacing of the piles in the rows is 2 ft. 6 in. to 3 ft., the rows being on 3 ft. centers.

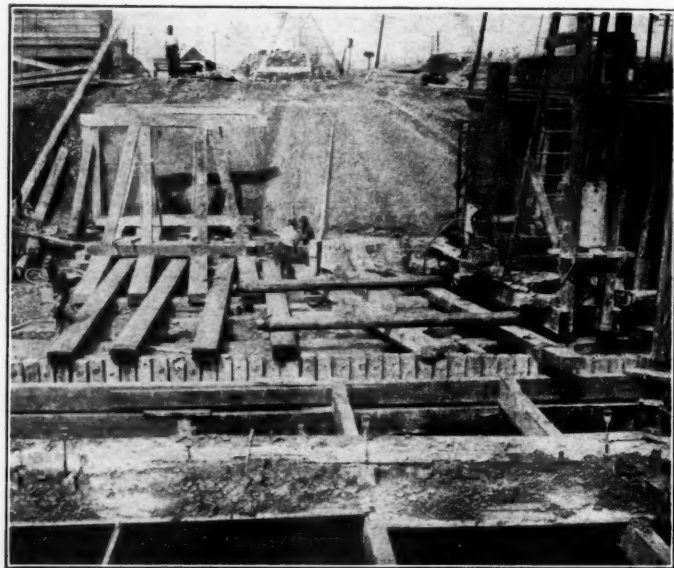
The superstructure in general is similar to that for the L. S. & M. S. over the same river. The length on center line of bridge is 165 ft., one truss being a panel length longer than the other,

since the skew is greater than in the L. S. & M. S. bridge.

The plans of the substructure were prepared by S. M. Kieland, engineer, Buffalo Creek, and the work was done by the A. P. Chapman Co., Buffalo, N. Y. The plans of the superstructure were prepared under the direction of the late Chas. W. Buchholz, consulting engineer, and F. A. Howard, engineer bridges and buildings of the Erie. The steel work is being fabricated and erected by the American Bridge Company.

THE NEW YORK, CHICAGO & ST. LOUIS BRIDGE.

This bridge, which is also used by the Pennsylvania, crosses the river about 100 ft. north of the Buffalo Creek Railroad crossing, the two bridges being parallel. The present bridge is a double track steel structure of two spans, the length of each span under copings being about 135 ft. The old steel work was



Cofferdam of Wakefield Sheet Piling; New York, Chicago & St. Louis.

partly dismantled and used temporarily as a platform from which to conduct operations connected with the building of the new bridge.

The superstructure of the new bridge consists of two through plate girder approaches, each 89 ft. long, and a Scherzer rolling lift bridge with plate girder track span. The moving span is skewed at the front end, and square at the rear end, with unequal truss lengths, the short truss being 154 ft. 7 in., and the long truss 175 ft. $5\frac{1}{4}$ in. center to center of bearings. The span length of the bascule on the center line of the bridge is 165 ft. $\frac{1}{8}$ in. The track girder span is 40 ft. The lift bridge over the main river channel has a width of 100 ft. between the fender lines, the clear river width under each of the plate girder spans being 62.5 ft. The water surface width of the river is 256 ft., and the bottom width 190 ft., with a water depth of 22 ft. at mean lake level, the distances given being those at right angles to the current.

The bridge will be operated by two 75 h. p. motors having a speed of 475 r. p. m. on a three phase 25 cycle alternating current at 445 volts. These motors and the machinery through which the power is transmitted to the main operating pinions are located upon a machinery platform placed above the clearance line and between the trusses at the rear end of the bridge just in front of the counterweight box. The power of the motors is transmitted through gearing to the main operating pinions, the shafts of which pass through each truss at the center of roll which is at the center of the segments. The centers of the shafts driving the pinions at any position of the bridge are always equi-distant from the surface of the track plates, and the motion of the pinions is horizontal and parallel with the surface of the track plates.

Racks with which the main operating pinions engage and by means of which the bridge is actuated are located outside of the plane of the trusses on independent fixed rack supports. These rack supports are bracketed out from each end of the track girders with diagonal braces running from the center of the rack girder down to the end posts of the rack supports at points opposite the tops of the track girders. The simplicity and efficiency of this operating mechanism makes possible a great saving in the machinery.

As an auxiliary equipment for operating the bridge when electric current is not available a gasoline engine will be provided. This engine will be located in the operator's house and the power will be applied to the machinery through friction clutch couplings. The bridge can also be operated by hand.

When in the closed position the bridge is locked by a lock bar of forged steel 10 in. x 1½ in., this bar engaging with a casting anchored to the masonry of the front pier. The lock is actuated by a hand lever in the operator's house through a pipe connection with a device at the break between the movable span and the fixed span to allow for the connection being broken when the bridge is operated.

An air buffer is provided at the front end of the moving span for seating the bridge on the front pier without shock or jar. This buffer is of simple design, with a 12 in. bore and a 24 in. stroke. It is attached to the front floor beam at about the center line of the bridge, the plunger coming in contact with a casting anchored to the masonry of the front pier. Bumping blocks are provided at the rear end to prevent the bridge moving beyond the fully opened position.

The front lock mechanism is interlocked with the signal system and with the bridge operating mechanism, so that the lock cannot be opened and the bridge operated until the signals are set at danger and the derails opened, and the bridge must be closed and locked before the signal can show clear and the derails be closed.

The operator's house, which is located on supports at one side of the track girder span, will contain all of the equipment for controlling the operation of the bridge. It will also have a mechanical indicator so placed as to be in full view of the operator showing the positions of the bridge at all times during operation. A bell will also be provided to be rung automatically by the bridge as a warning to the operator before the fully opened and fully closed positions of the bridge are reached.

Owing to the proximity of the Buffalo Creek Railroad bridge, the piers of the two bridges are on the same axes, the angle of skew being the same. As the bridge is being built on the site of the present one, traffic is diverted and temporarily maintained over a pile bent trestle erected to the south.

The substructure consists of three piers and two abutments, numbered from the east to the west, all masonry being of concrete, founded on piles driven to bedrock, which is reached at a depth of 45 ft. below mean water level. Abutment 1 and pier 2 are the main supports of the Scherzer rolling lift bridge, and were built inside timber cofferdams, built of Wakefield sheet piles, each composed of 2 in. x 10 in., and one 2 in. x 12 in. plank, 30 ft. long, assembled in the usual manner. Pier 3 located in the river was also built in a wooden cofferdam consisting of square timbers 12 in. x 12 in., grooved on opposite sides. The grooves were 2 in. square in cross-section, and when the timbers are in juxtaposition, a timber tongue, 2 in. x 4 in. was driven into the groove to render the cofferdam watertight. The timbers of the structure were driven by a floating pile driver. The concrete is a 1:2:5 mixture. A Ransome mixer was used, the charge being one bag of cement, two wheelbarrows of sand and four wheelbarrows of broken stone, gaged to give the required proportions. The cement and concrete aggregates were delivered in standard cars and wheeled up an incline to discharge into a hopper over the mixer which was placed about 6 to 8 ft. above track level. The concrete was made wet and delivered to the work in wooden chutes.

This bridge is being built under the direction of E. E. Hart, chief engineer of the New York, Chicago & St. Louis.

A PROPOSED NEW ENGLAND RAILROAD COMMISSION.

At the invitation of Governor Foss, of Massachusetts, a conference was held in Boston last Saturday, attended by the governors of all the six New England states except Maine, the governor of which was unable to accept the invitation. Governor Foss proposes a "New England railroad conference" to be composed of two citizens from each state; and, after the conference of Saturday, he gave out the following outline of the purposes which it is hoped to accomplish:

The conference will consider and report upon the general subject of railroad development and operation, and in particular will investigate the following phases of the railroad question:

1. The establishment of a permanent conference composed of the heads of the state commissions having supervision over railroads.
2. The question of creating state directors representing the various New England states in the management of the railroad system, and the general question of the participation of the public in the ownership or operation of transportation facilities, and the form of such participation.
3. The consideration of means whereby the projected Grand Trunk extension may be completed.
4. Means of providing through transportation by way of Boston, and the consideration of the best method of accomplishing this, whether by tunnels or belt lines, or both.
5. The project of electrifying the terminals and providing adequate electric traction throughout crowded urban and suburban districts.
6. A reasonable plan of interchangeable mileage tickets to be applied over the entire New England railroad system.
7. A plan of uniform legislation providing for the unification of the corporate entity which manages the railroads in a manner which will make the legal fact of unification correspond with the actual control now exercised. This will involve a consideration of the whole question of whether the Boston & Maine shall remain a part of the New Haven system or can better serve New England as a separate system, the question of the elimination of the Boston Railroad Holding Company, and the question to what extent, so far as the federal laws and the fixed policy of the several states permit, the railroad shall own and operate steamship and trolley lines.
8. A plan to co-ordinate and unify all lines and services.
9. Reduction of all leases of lines to absolute ownership.
10. The consideration of means to make the railroad corporation amenable in its entirety to public control, in the manner of a domestic corporation doing business in each state.
11. The consideration of uniform charters to the railroad corporation in each of the states in which it operates lines, with uniform reservations of power of control by the state.

Governor Haines, of Maine, in a letter to Governor Foss, written after reading the report of what was done at the Boston conference, commented at length on each of the eleven paragraphs of the resolutions adopted at the conference; and he called attention in rather plain language to some of the weaknesses of Governor Foss's proposals. The state of Maine already has a terminal of the Grand Trunk, and the relations between the state and the railway company appear to be quite satisfactory. Governor Haines says that a permanent conference "can do no harm and might do some good." He does not see how directors of a railroad can be appointed by a state which owns nothing in the property. He does not believe in state ownership. He has not much interest in the crowding of passengers in suburban trains, but he does expect that Maine, with its abundant water power, will soon have all its railroads operated by electric power. The legislature of Maine is now considering the establishment of a public utility court to take the place of its railroad commission, and therefore it does not seem desirable at present that the Maine commission should take part in a New England organization.

THE PAYMENT OF EMPLOYEES IN CASH.

A Description of the Method Used on the Pennsylvania Lines
West Where About \$4,800,000 Is Paid Out in Cash Each Month.

Every officer and employee of the Pennsylvania Lines West, from the president to the switchmen and crossing men are paid in cash monthly; payments are made between the fourth business day and the twentieth of each month. It is not of much moment to the president whether he receives his salary in cash or by check, but it is of a great deal of importance to the switchmen.

The one point at which the employee comes most closely in contact with the company, is at the time he receives his wages. At this time he forms an impression of the attitude of the company; it becomes personal to him as something distinct from his particular boss. Unconsciously his own attitude toward the outside public reflects, to a certain extent, the attitude of the

pared and certified to by the auditor and made out and sent to the agents by the treasurer's department. Second, checks made in the same way may be delivered directly to the employees by the treasury department. This necessitates running a pay car. The third method is to have the treasury department pay directly in cash to each employee. This also necessitates the running of a pay car. The following is a list of some of the roads that now have one or other of the two check systems in use and those using the cash system.

CASH AND PAY CAR.

Birmingham Southern.
Central of New Jersey.
Hocking Valley.
New York Central & Hudson River.

Pennsylvania Company, Lines West.
Pennsylvania Railroad.
Vandalia.

No. 9	
Chicago, Ill., _____, 19____ \$ _____	
RECEIVED OF THE TREASURER OF THE EAST & WEST RAILROAD COMPANY	
_____ Dollars,	
to be applied to payment of rolls for month of _____, 19____	
Paymaster	

Received of the Treasurer of the
EAST & WEST RAILROAD COMPANY
for payment of rolls month of _____, 19____
\$ _____

Receipt Given by the Paymaster for Money Received from the Treasurer.

company towards himself. If this attitude is courteous, if, in the company's relations with the employee, there seems to be a real attempt to deal perfectly fairly, the man is inclined to feel that this is the attitude which he should take toward the company's patrons. On the other hand if the employee gets the idea that the company is dealing with him in a sharp manner and that regardless of justice the company will see that its own interests are preserved, then when the employee represents the company in its relations with the general public his attitude will reflect this feeling.

In the payment of wages, there are three objects to be attained. The employee should get the wages which he has earned

CHECK AND PAY CAR.

Chicago, Burlington & Quincy.
Grand Trunk.

Illinois Central.
Intercolonial Railway.

CHECK AND NO PAY CAR.

Atchison, Topeka & Santa Fe.
Baltimore & Ohio.
Buffalo & Susquehanna.
Central of Georgia.
Chicago, Rock Island & Pacific.
Chicago & Western Indiana.
Evansville & Terre Haute.
Gulf, Colorado & Santa Fe.
Kansas City Southern.
Lehigh & New England.

Lake Shore & Michigan Southern.
Michigan Central.
Missouri, Kansas & Texas.
Norfolk Southern.
St. Louis & San Francisco.
Seaboard Air Line.
Southern Railway.
San Pedro, Los Angeles & Salt Lake.
Union Pacific.
Wheeling & Lake Erie.

On the Pennsylvania Lines West there are five pay cars; three starting from Pittsburgh, one from Columbus and one from

No. 8 EAST & WEST RAILROAD COMPANY																																																																																					
To _____, Div.																																																																																					
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This form to be used, when payments are completed, for showing the name, occupation, time, rate of pay, deductions and amount payable to any employee who has failed to receive his money. After being checked against the roll and approved by the Auditor, it is returned to the Paymaster so that payment can be made at any time the employee should call for it.

Duplicate from Pay Roll.

as quickly and as conveniently as possible. Some means should be adopted by which the company can be sure that the employee earning the wages actually receives what he has earned and gives a valid receipt. The third object is that payment shall be made by a different department than the one which prepares the pay roll and hires the employee. There are three common methods of payment. Checks may be delivered by the company's agents to the employees; these checks having been pre-

REASON FOR ISSUE	No. 8 TO BE USED ONLY IN CASE OF SICKNESS OR UNAVOIDABLE ABSENCE											
	EAST & WEST RAILROAD COMPANY											
	_____ Division											
	_____, 19____											
	Pay to _____ the amount due me for services rendered											
	in the month of _____, 19____, as _____ under the direction											
	of _____, and his receipt shall be a full release and discharge											
	for the same.											
	WITNESS _____											

Issued only by heads of departments.

Pay Order Issued Only in Cases of Sickness.

Terre Haute. These five cars between the fourth and the twentieth of each month distribute about \$4,800,000 cash. Each car is in charge of a paymaster, who has a clerk, and in addition there are three or more guards on the pay car. In point of complication, the Pennsylvania Lines West presents as difficult a problem for the routing of pay cars as any system of lines in the country. The lines, of course, lie in territory east of the Mississippi river, so that there is not, possibly, the same danger of an organized attack on the pay car as would be the case on some lines in the West; on the other hand, the problem

PAY ROLL No. _____ C. T. No. _____ M. of W. No. _____ Shop No. _____ EAST & WEST RAILROAD COMPANY For Personal Services Rendered as _____		ACCOUNTS PAYABLE		TO SUNDRY PERSONS, DR. During the Month of _____, 19____		DIVISION _____								
No.	NAME	OCCUPATION	TIME			RATE	AMOUNT EARNED	DEDUCTIONS			AMOUNT PAYABLE	SIGNATURES	WITNESSES	
			Hours	Trips	Days			Month	Price Work	BOARD In Favor of				Amount
1														
2														
3														
4														
5														
TOTALS													29	
TOTALS													30	

I certify that the above named persons have been diligently employed in the service of this Company, and that the time and rates are correct:

Examined and Approved _____ Superintendent _____
 Examined and Approved _____ General Manager _____

Audited and Approved for \$ _____
 Approved for Payment: _____ Auditor _____
 Comptroller _____

No. 2
PAY ROLL No. _____ C. T. No. _____

EAST & WEST RAILROAD COMPANY

For Personal Services Rendered as _____

ACCOUNTS PAYABLE

To SUNDRY PERSONS, DR.

DIVISION _____

During the Month of _____, 19____

Received of the EAST & WEST RAILROAD COMPANY the amount of _____ Dollars, for _____

of the EAST & WEST RAILROAD COMPANY.

Audited and Approved for \$ _____

No.	NAME	OCCUPATION	TIME AND RATE OF PAY				AMOUNT EARNED	DEDUCTIONS			AMOUNT PAYABLE	SIGNATURES	WITNESSES
			Trips		Hours			BOARD In Favor of	COMPANY COLLECTIONS				
			Rate	Trips	Rate	Hours			Amount	Rent			
1													
2													
3													
4													
5													
29													
30													
TOTALS													

I certify that the above named persons have been diligently employed in the service of this Company, and that the time and rates are correct:

Examined and Approved _____ Superintendent

Examined and Approved _____

Authorized, Examined and Found Correct

APPROVED _____

General Manager

Auditor _____

Approved for Payment: _____

Controller _____

of paying employees and especially train crews, without unduly delaying traffic is far more difficult on these lines than would be the case on western lines where traffic density is much less.

Of the three cars running from Pittsburgh, one goes over the Eastern division, Western division and the Fort Wayne side of the Chicago Terminal division. The second car pays

men is to provide space for different rates paid, so that a full thirty names may be shown on each roll. The rolls are made up on a typewriter, two carbons and an original being made. One carbon is sent to the pension department and one is retained in the superintendent's office, while the original roll on stiff paper is sent to the auditor's office, after having been

No. _____ Memorandum of Amount Due _____ at _____ For Services as _____ in Month of _____, 19____ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TIME</th> <th>RATE</th> <th>EARNED</th> <th>DEDUCTIONS</th> <th>PAYABLE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> Issued _____, 19____ By _____	TIME	RATE	EARNED	DEDUCTIONS	PAYABLE											19____ Counterigned,	No. 7 EAST & WEST RAILROAD COMPANY Division _____ Memorandum of amount due _____ at _____ for Services as _____ in Month of _____, 19____ I certify that the accompanying statement is correct and that the amount will appear on the proper roll for the Month of _____ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TIME</th> <th>RATE</th> <th>EARNED</th> <th>DEDUCTIONS</th> <th>PAYABLE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> Approved for _____ Dollars _____ Superintendent RECEIVED _____, 19____ of the EAST & WEST RAILROAD COMPANY in full for services as above stated _____ Dollars (\$ _____) WITNESS: _____ <small>RECEIPT SIGNED BY MARK MUST BE WITNESSED BY THE PAYING AGENT AND ONE OTHER PERSON</small>	TIME	RATE	EARNED	DEDUCTIONS	PAYABLE										
TIME	RATE	EARNED	DEDUCTIONS	PAYABLE																												
TIME	RATE	EARNED	DEDUCTIONS	PAYABLE																												

This form is issued by the superintendent and is sent to an agent of the company before whom the employee must present himself and be identified.

Form Used to Pay Employees Who Leave the Service.

over the Erie & Pittsburgh division; the Cleveland & Pittsburgh and the Marietta division. The third car pays over the Pittsburgh division of the Panhandle; the Cincinnati & Toledo division of the Panhandle and over the Akron and Zanesville divisions. The car leaving Columbus runs over the Indianapolis division, the Indianapolis Terminal division, the Louis-

signed by the superintendent and approved by the general manager. It is there audited and approved for payment and is sent to the treasury department. It reaches the treasury department on the third business day of the month, and on the same day the paymaster receives the treasurer's check for the cash that he will need the next day. He begins paying at 6:30 in the morn-

Pay Roll No. _____ No. _____ Memorandum of Amount Due _____ at _____ on _____ Division _____ For Services as _____ in Month of _____, 19____ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>TIME</th> <th>RATE</th> <th>EARNED</th> <th>DEDUCTIONS</th> <th>PAYABLE</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> Issued _____, 19____ By _____	TIME	RATE	EARNED	DEDUCTIONS	PAYABLE											19____ Correct:	No. 6 EAST & WEST RAILROAD COMPANY Division _____ For Services as _____ at _____ on _____ under the direction of _____ as returned on Pay Roll No. _____ Month of _____, 19____ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4">TIME</th> <th colspan="4">RATE OF PAY</th> <th>AMOUNT EARNED</th> <th>DEDUCTIONS</th> <th>AMOUNT PAYABLE</th> </tr> <tr> <th>Hours</th> <th>Trips</th> <th>Days</th> <th>Month</th> <th>Per Hour</th> <th>Per Trip</th> <th>Per Day</th> <th>Per Month</th> <th> </th> <th>For</th> <th>Amount</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> Paymaster Pay to the order of _____ Address _____ Dollars (\$ _____) in full for services rendered as above FIRST NATIONAL BANK BLANKSVILLE, MO. EAST & WEST RAILROAD COMPANY Treasurer	TIME				RATE OF PAY				AMOUNT EARNED	DEDUCTIONS	AMOUNT PAYABLE	Hours	Trips	Days	Month	Per Hour	Per Trip	Per Day	Per Month		For	Amount																						
TIME	RATE	EARNED	DEDUCTIONS	PAYABLE																																																									
TIME				RATE OF PAY				AMOUNT EARNED	DEDUCTIONS	AMOUNT PAYABLE																																																			
Hours	Trips	Days	Month	Per Hour	Per Trip	Per Day	Per Month		For	Amount																																																			

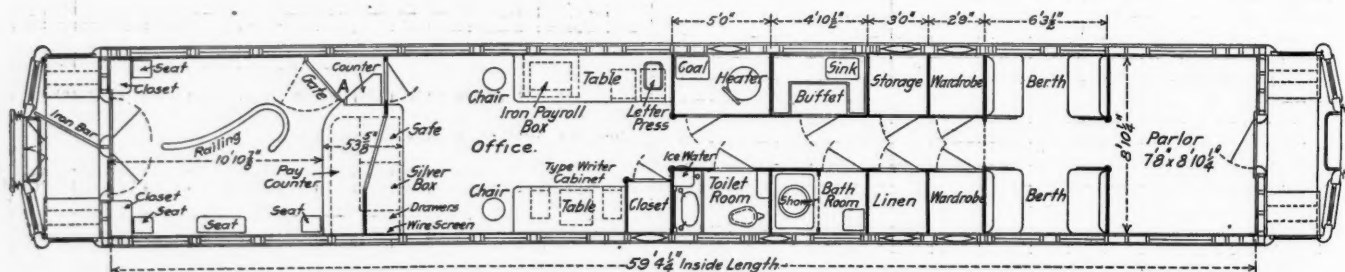
Check Sent to Employee Who Is Unable to Meet the Pay Car.

ville division, the Richmond division, and the Logansport division. The car leaving Terre Haute runs over all of the divisions of the Vandalia and the Panhandle side of the Chicago Terminal.

There are two forms of pay rolls used; the one shown herewith as No. 1, is for agents and their forces, operators and em-

ing on the fourth day. Where the employee is known to the paymaster no witness' signature is required; where the paymaster does not know the employee and in all cases where the employee must sign his name by mark, a witness' signature is required.

A diagram of the arrangement of pay car is shown here-



Plan of the Pay Car.

ployees of the transportation department, working by the month or day, and for all employees in the maintenance of way department and in shops. No. 2, is for all transportation employees in train service; the object in having the second form for train-

with. The paymaster's clerk stands at "A" with the rolls arranged in a clip at his left hand; this clip is provided with an ink well and space for a pen on the right hand side. It will be seen that the paymaster's clerk has the rolls directly under

No. 14

EAST & WEST RAILROAD COMPANY

TREASURY DEPARTMENT

_____, 19____

Dear Sir:— _____

Please give below the information requested, and
return this promptly

Respectfully,

Paymaster

Name _____

Occupation _____

Amount payable from _____ to _____ inc., \$ _____

Amount payable from _____ to _____ inc., \$ _____

Residence _____

Married or Unmarried _____

Yours truly,

_____, 19____

Paymaster's Request for Information from Superintendent.

[illegible]

**Form Used by the Paymaster in Making a Report to the
Company's Solicitor in Attachment Proceedings.**

his hands, and at the same time, the employee has the portion of the roll to which he puts his signature directly in front of him. The paymaster stands behind the 53-in. counter and faces the rear doors of the car. He has an unobstructed view of the entire car back of the counter. Employees enter the car at the rear door at the left. There is a guard stationed between the two doors at the rear and one or two guards are placed where seats are shown outside of the pay

No. 11			
EAST & WEST RAILROAD COMPANY			
DIVISION			
ATTACHMENT			
Case No. _____			
vs.			Plaintiff
Defendant			
Occupation _____			
J. P			
Claim, \$ _____ Costs, \$ _____ Total, \$ _____			
Writ served at _____ M. _____, 19 _____			
Answerable at _____ M. _____, 19 _____			
Employing Officer asked to state Amount Due Defendant _____, 19 _____			
AMOUNT DUE DEFENDANT AT DATE OF SERVICE			Writ sent to Solicitor _____, 19 _____ Reported to Solicitor _____, 19 _____ \$ _____ due
Pay Roll No.	Month	Amount	
Case compromised for \$ _____			
Order of Court to pay \$ _____ received and forwarded to Solicitor _____, 19 _____			
Received _____, 19 _____ Approved Order for \$ _____			
Date of Remittance to Court _____, 19 _____			
Fee Collected, \$ _____			
Court Receipt attached to _____			
Case Disposed of in Month of _____, 19 _____			
_____, 19 _____			
In the above action please pay into Court, out of money due me, the sum of \$ _____			

Attachment Envelope with Record of the Case.

counter. The employee steps up to the paymaster's clerk, gives his name and signs his name on the line opposite the amount due him; the clerk calls off the amount due, this is repeated by the paymaster, who counts out the money from the drawer under the counter, the amount is again repeated by the clerk, is verified by the paymaster and is pushed across to the employee, who steps to one side, counts his money, and passes out by the rear door at the right. When gangs of

men are being paid, the foreman enters first, signs his name, receives his pay and steps inside the curved railing, shown on diagram; the members of the gang follow in the order in which their names appear on the roll; after each one of the gang has been paid the foreman signs each roll once, as witness for the men in that gang. As the clerk calls each man's name, the foreman answers present for him. It is almost impossible for the wrong man to be paid under this system, if the rules are carefully followed. The foreman has the man that he is identifying directly in front of him and only a foot or two away.

In paying officers, instead of calling out the amount due, the clerk writes the amount on a slip of paper and hands it to the paymaster, who counts out the cash and lays the slip of paper on top of the amount and passes it across the counter.

Train crews have precedence over all other employees; there is room so that a line of trackmen can step to one side and let road enginemen and trainmen pass directly to the clerk and paymaster with no delay. It is a fact that on the Pennsylvania Lines West, from 300 to 350 employees are paid in an hour. There is not the least hurry or confusion, and almost never does a question arise that cannot be answered almost instantly and satisfactorily by the paymaster. It will be noticed that there is room for three men to stand across the counter; one is signing his name, one is receiving his money, and one counting his money. Where the lower class of employees sign their names and receive from \$30 to \$75, the paymaster is a little ahead all of the time of the employee who finds his money waiting for him by the time he is finished with the pen; where the employee is of the higher grade, and makes less of hard labor in signing his name and receives from \$100 to \$200, the paymaster is usually a fraction of a second behind the man in getting the cash across the counter.

The underlying objection that railroad men generally have had to the payment by cash is that the treasury department has not been broad enough, or shown common sense enough to co-operate with the operating department. It would seem that it would not take a high order of intelligence to realize that in making payments of wages the treasury department is not conferring a favor on the operating department, or on the individual employee. It has been a spirit of co-operation in the running of the pay car that has made payment in cash on the Lines West an unquestioned success. The system is by no means capable of running itself; the paymaster must be a high-class man, who can be trusted with large sums of money, but fully as important, he must be a man who can enter into the spirit that lies back of the use of the cash system; this spirit is somewhat intangible,

of affording every possible facility to the men. At terminals and shops an old coach is attached to the rear of the pay car so that men waiting to be paid may be protected from the weather.

The object in having a treasury department is to have money paid by a different department than the one which authorizes

No. 13'

EAST & WEST RAILROAD COMPANY

TREASURY DEPARTMENT

Chicago, Ill., _____, 19____

Dear Sir:—

Please take notice that a suit has been instituted

before _____

at _____ wherein

_____ is plaintiff,

and you are defendant, and that this Company has been made Garnishee therein.

Claim and probable costs, \$ _____

This proceeding is for answer on the _____

day of _____, 19____, at _____ M., and

notice is hereby given that you must make such defense as you desire against this suit, set up any exemption you may claim, or offer objections as to the jurisdiction of the Court.

Treasurer

Notice to Employee That His Wages Have Been Attached.

the payment; where pay checks are sent to agents for distribution in actual practice the same department, namely, the operating department, delivers the check to the same employee that the operating department hires, and also, in a great number of cases, cashes the check for the employee. This leaves the chance open for padding the pay rolls. Of course, where a pay

STATE OF _____ COUNTY OF _____ VS. PENNSYLVANIA COMPANY, GARNISHEE.	No. _____ CASE No. _____	STATE OF _____ COUNTY OF _____ VS. PENNSYLVANIA COMPANY, GARNISHEE.	No. _____ ACTION IN COURT OF _____
ACTION IN COURT OF _____		FOR SETTLEMENT OF JUDGMENT, INCLUDING COSTS, IN ABOVE ENTITLED ACTION, FROM WAGES DUE DEFENDANT AS RETURNED ON PAYROLL No. _____ MONTH OF _____ 19____	
IN SETTLEMENT OF JUDGMENT, INCLUDING COSTS, IN THE ABOVE ENTITLED ACTION, FROM WAGES DUE DEFENDANT AS RETURNED ON PAYROLL No. _____ MONTH OF _____ 19____, AMOUNTING TO \$ _____ PAID INTO COURT _____ 19____.		PITTSBURGH, PA.	
ISSUED BY _____		PAY TO THE ORDER OF _____ ADDRESS _____ DOLLARS (\$ _____) Pennsylvania Company.	
FORM 513 10-10-10		NOT GOOD FOR MORE THAN \$150. ASSISTANT TREASURER.	

On the back of the check is printed: Endorsement of this check by the Payee is an acknowledgment of payment thereof in full and that the Railroad Company as garnishee is released from any and all liability as far as within entailed case is concerned.

Check Used to Pay Into Court Judgments Obtained in Attachment Proceedings.

but it may be suggested by saying that the burden of seeing that the employee gets his wages easily and quickly rests not on the employee, but on the paymaster. In running the car, the operating department is consulted and every effort is made to put the employee to as little trouble as possible, the car stops at each crossing, at each point where it is most convenient for men to reach it, and is handled at all times with the sole object

car distributes pay checks directly to employees, this danger is done away with; the operation of a pay car in this case is a little less costly than under the cash system, but on the other hand, the convenience to the employee is very greatly less. The company receives a valid receipt in either case and the expense of preparing the checks from the rolls is considerable.

The most fruitful source of danger of fraud on the one

hand, or of inconvenience to the employee on the other hand, is in cases where a man leaves the service, or, for some other reason, must be paid before the rolls are made up, and before the pay car makes its trip. Under the cash system on the Pennsylvania Lines West, Form No. 7 is used in such cases. This form is issued by the superintendent, requires the signature of superintendent and the counter signature of some one designated by him, and is sent in a sealed envelope to the paying agent, who is authorized to give cash to the employee on proper identification and is then permitted to remit the signed receipt as cash with his other cash. Where an employee has been unable to meet the pay car and it is found necessary to pay him before the pay car makes its next trip, a check (Form 6) is sent directly to the employee.

A very important use of this check on the Pennsylvania Lines West is in cases where employees are, because of sickness or from some other unavoidable cause, in urgent need of money. In such cases a check may be sent before the end of the month, and the relief granted is often of very great importance, while the loyalty gained from such treatment is a matter that can hardly be measured in dollars and cents.

In a case where the employee misses the pay car one month, a copy from the pay roll (Form 3) is made and is sent out each month on the car for two years, or until the pay has been received and receipted for by the man who has earned it. The man signs this duplicate in the same way as he would the pay roll and it is then attached to the pay roll to which it belongs.

The forms used in connection with the attachment of employees' wages or liens obtained on the wages are shown herewith, the explanation of the use is given with each form.

Some conception of the labor involved in paying out nearly a million dollars from each car in small denominations in 16 days may be gained when it is said that 145,000 pieces of money are handled in one day by the paymaster. The silver is in a drawer at the right hand side of the counter, and the bills, which are in three piles, 5's, 10's and 20's, in a drawer at the left hand side of the counter. Silver dollars and change are used to pay fractions of \$5, and unless a man has particularly asked for larger denomination bills, nothing larger than a \$20 bill is used to pay with.

The paymasters receive a day or two in advance their checks for daily requirements. These checks vary from \$80,000 to \$150,000, and are drawn to the paymaster's order by the treasurer. They are drawn on a bank in a town which the paymaster will reach on the day he needs to cash the check and the paymaster keeps the bank informed ahead of time of the denominations of bills which he wants. A consistent effort is made to get clean bills. By paying in no higher denomination than a \$20 bill, although it takes a little more of the paymaster's time, the employee is given his wages in a form that is most convenient for him. He does not have to wait to go to a bank to have a \$50 bill changed; he has some large and some small bills, and, most important of all, he is not dependent on the saloon keeper for favors, as is the case where checks are used. Neither does he have to ask a favor of the railroad company's agent, as is the case where checks are used and companies' agents are authorized to cash these checks.

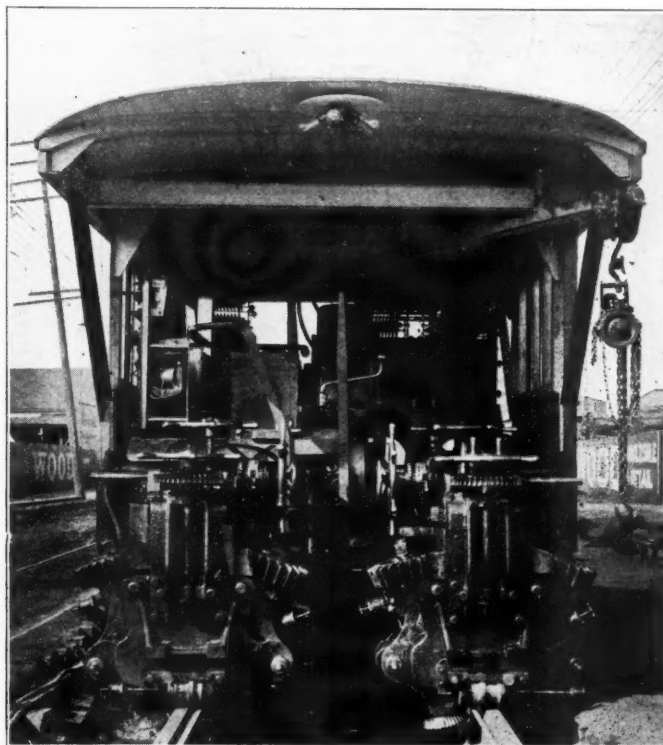
The success of such a system as that used on the Pennsylvania Lines West for the payment of employees depends on the care in working out the details, in the training of men, and the perfection with which every minutest detail is gone through with. We have become accustomed to accept without question the fact that a variation of a hundredth part of an inch in some piece of machinery will throw the entire machine out of order. A system of paying by cash where such large quantities of cash are handled requires a machine that is as delicately and truly adjusted as a watch. Every detail and every measurement of a pay car must be studied and adjusted and readjusted until it exactly fits and meets its requirements. A delay of a fraction of a second in turning over the rolls in the clip will add up to a strikingly large figure when multiplied by the number of times

that the rolls have to be handled in 16 days by the paymaster's clerk. The paymaster has no way of checking up the amount of money which he pays out until the end of the 16 days. It is therefore, absolutely essential that each transaction, that is, each payment, shall be perfectly made. To do this at the rate of 300 payments an hour without confusion and without hurry requires a high class of man for paymaster, as well as a minutely worked out system.

A CONTINUOUS RAIL.

A composite rail consisting of a base section and a separate top section which staggers joints and which can be rigidly attached to the base, has been developed by the Continuous Rail Company, and has been tested with satisfactory results in street railway tracks in Leeds, England; Paris, France, and Chicago, Ill. While a number of advantages that the rail possesses for street railway work do not apply to main line service on steam roads, there are advantages claimed for such service that are attracting the interest of the steam railway engineers to whom designs have been presented.

For use in paved streets the combined rail can affect a very great saving, because in renewing, only the top section of the



Electric Machine Used for Crimping Flanges of Continuous Rail on Base Section.

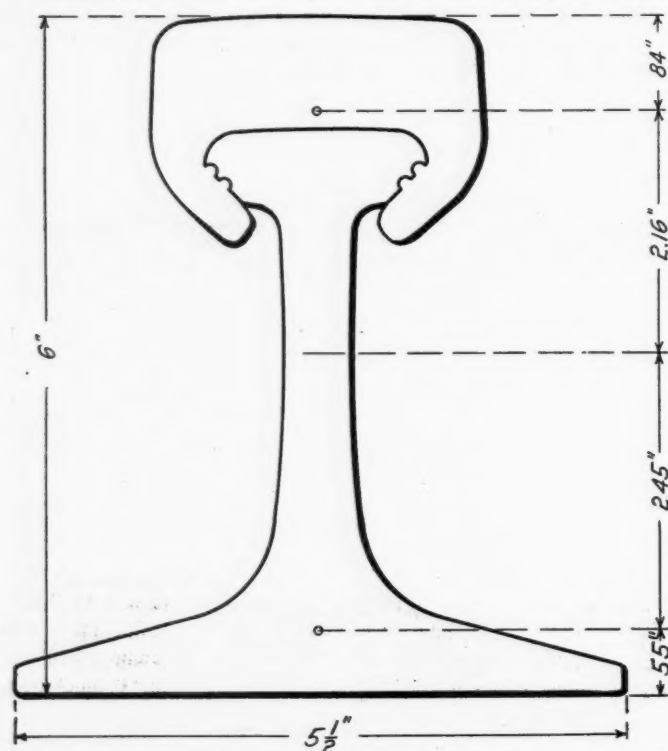
pavement need be disturbed to allow the lips holding the top section to the base to be cut away and those on the new section to be rolled into contact. For electric lines the increased conductivity resulting from the action of the alternate sections as a mechanical bridge over the joints of the other sections, allows a material saving in copper bonding.

The principal advantages urged for such a rail in main lines of steam railways are the absence of open joints and the ability to renew the worn heads without displacing the base of the rail. For exposed track the joint in the top section would be placed at a distance from the joint in the base equal to about 10 per cent. of the length of the rail, or 3 ft. in a 30 ft. rail. To allow for expansion and contraction, the lips holding the top section on the base would only be bent into contact and would not be crimped tightly to the base over this short sec-

tion between the two joints, making a slip joint. This would allow free longitudinal movement between the base and the top section for the last 3 ft. of the "taking off" rail, the receiving rail being made fast. The joints in the head section of the rail would be supported by a solid base rail, eliminating low joints and the tendency to extreme wear and breakage at the joint. It is also claimed that the danger from broken rails would be very materially decreased, as a break in either the base or the head could scarcely occur directly above or below a joint in the other portion of the rail and a break resulting from a defect in either section would still leave the rail strong enough to carry traffic. The higher original cost of the continuous rail is offset by the fact that the worn head can be removed and a new one put on without taking out of service the heavy base section.

It has been shown by examination of continuous rails in service that the quality of the metal is better than that in standard rails, because in the continuous rail the head section is so rolled in the mills that the tread receives the direct pressure of the rolls at each pass.

In laying the rails the top section is dropped over the base



Section of Continuous Rail With Removable Head.

section and a machine for bending the lips is then run over the track, making the connection shown on the drawing. When these lips are first bent the metal along the inner edge of the section is in compression and that along the outer edge in tension, tending to draw the lips away from the base section. The operation of rolling is continued, however, until the metal in the lips is caused to flow transversely and becomes materially elongated so that the stresses are reversed, bringing compression along the outer edge and tension along the inner edge. As the result of this cold rolling process, the lips of the upper section are converted into springs to grip the head of the lower section. In a test made by R. W. Hunt & Co., a pressure of 72,330 lbs. was required to start a slipping movement of the head section over the base in a test piece 12 in. long cut from a rail that had been laid in the track. To remove the worn head a rolling cutter is substituted for one of the rollers and the machine is passed back and forth along the rail until a cut through about two-thirds of the thickness of the lip is made. It is then possible to break the remaining thickness, remove the old top section and place the new one.

A section of the continuous rail corresponding to the New York Central 100-lb. rail is shown in the accompanying drawing. The area of the base section is 7 sq. in., and of the top section, 3.74 sq. in., giving the combined section a weight of about 108 lbs. As shown in the sketch, the proposed section is so designed that the neutral axis is an equal distance from the top and bottom of the compound rail. The moment of inertia of this section is 50.76, and the section modulus 16.92.

Although no continuous rail has been installed on steam roads, it is thought that the first development for such lines will be the combination of open-hearth base and rolled manganese top. It is claimed that such a construction would insure a better grade of metal in the tread than can be secured with solid manganese rails, would offer all the improved wearing qualities of solid manganese rails at a lower price and in addition, would provide for the renewal of the manganese tops at a comparatively low cost.

PROTEST AGAINST FREIGHT CLASSIFICATION BY GOVERNMENT.

The National Industrial Traffic League has issued an appeal to its members to use every influence against the passage by Congress of the bill, already passed by the Senate, to require the Interstate Commerce Commission to formulate a uniform classification. In its circular the league says:

"We fear a legislative-made classification would be too rigid and not sufficiently flexible to meet the varying conditions existing in different territories and constantly arising under the varying demands of commerce. We believe the right of initiative in the making of the classification of freight should continue with the carriers through a proper body constituted for that purpose; that the work of the classification committee, or committees, should be subject to review upon formal complaint as to any specific item or items, or, upon its own initiative, by the Interstate Commerce Commission as now authorized by the act to regulate commerce."

NEW ZEALAND RAILWAYS.—The railway system in New Zealand comprises about 2,761 miles. Broadly, the system in the north island consists of the north and south trunk line running fairly central, and connecting Auckland and Wellington, the capital, with loops and important branches to east and west ports with some short spurs. In the south island the main line is an east coast one, with several branches running inland, more especially in the south. In the north and east of the south island the lines are at present isolated, but construction now in hand will lessen this defect. Many of the lines have entailed expensive construction, even with the economy in rough country that the narrow gage undoubtedly gives. Up to the date of the last report of the railways the cost has been an average of \$53,615 per mile.

TASMANIAN RAILWAYS.—Tasmania possesses 477 miles of railway on the 3 ft. 6 in. and 2 ft. gage, there being 25 miles of the latter. The main line from Hobart to Launceston, which was the first railway to be constructed, was opened in 1876 by the Tasmanian Main Line Railway Company, and was operated by that company until 1890, when it was purchased by the government. It is 113 miles long. Another, the Launceston & Deloraine, 45 miles long, was projected by a private company, helped by the government, but had to be taken over by the latter in 1872. A third line of private ownership opened in 1884 was that of the Emu Bay Company, which is still in their hands. The extensions since the above date are chiefly branches of the main line. The average cost per mile of the Tasmanian railways, some of which are through rough country, has been \$42,660. The gross receipts last year were \$1,389,580, the working expenses \$1,077,650, and the net receipts \$311,930.

LOCOMOTIVE TENDER DERAILMENTS.

More Contributions to the Controversy Which Started Last September. A Suggestion as to the Westport Wreck.

In the *Railway Age Gazette* of September 27, 1912, page 569, E. W. Summers of Pittsburgh, Pa., in a communication entitled "A Fortunate Wreck," commented upon tender derailments. A number of our readers took exception to his theories, while others agreed with him in whole or in part, the controversy extending over a couple of months.* Because of the heavy demands on our space it was not possible to publish several communications which were received during the latter part of the year, and which have an important bearing on the subject. Three of them are presented herewith in the order in which they were received:

"G. E." REPLIES TO MR. SUMMERS.

Under date of November 11, "G. E." wrote as follows:

In Mr. Summers' further discussion† of the subject of tender derailments, he disagrees with my statement that the velocity of the wheel is practically unaltered. Let us consider the simple case assumed by him, of a single wheel rolling along the track at a velocity of 88 feet per second, striking an obstruction one-

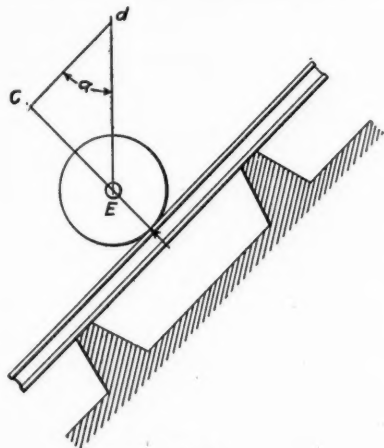


Fig. 1.

half inch high. Its kinetic energy before striking (neglecting that due to rotation) is about 240,796 foot pounds. To raise

the wheel $\frac{1}{2}$ in. a portion of this amounting to $\frac{2,000}{2 \times 12}$ is expended, leaving 240,713 foot pounds. The velocity corresponding

to this energy is $\sqrt{\frac{240,713 \times 2 \times 32.16}{2,000}} = 87.98$, or about $\frac{1}{4}$ in. per

second less than when it struck the obstruction. Now the average velocity as it rolls onto this half-inch elevation, can be roughly taken as one-eighth inch per second less than 88 feet.

The time required will be $\frac{1}{3 \times 88} = \frac{1}{264}$ seconds, so the distance

lost will be approximately $\frac{1}{8 \times 264} = .00047$ inch. If the wheel is

urged along by the momentum of the rest of the truck, the loss is but a small part of this. Is it enough to slew the truck? Referring to Fig. 1 (the same as Fig. 3, page 783, October 25, 1912), let us assume the weights to be free to move to the left, just as the wheel of Figs. 1 and 2 (September 27, 1912, p. 570), is free to rise. If v is its velocity, the component of the velocity perpendicular to the rail is $v \sin a$. Then the effect of the blow will be practically the same as if the weight struck the rail per-

pendicularly with a velocity of $v \sin a$. The energy of the blow would, therefore be $\frac{w v^2 \sin^2 a}{2g}$. But Mr. Summers says the

force of the blow (by which we must understand him to mean the energy of it) is reduced in proportion as the sine of the angle a is less than 1. This would make it $\frac{w v^2 \sin a}{2g}$. If Mr.

Summers was correct, we might have the weight strike two rails perpendicular to one another, the blows being $\frac{w v^2 \sin a}{2g}$

and $\frac{w v^2 \cos a}{2g}$. In other words, we would put $\frac{w v^2}{2g}$ foot-

pounds of work into the weight, and get back $\frac{w v^2}{2g} (\sin a + \cos a)$. We would build a "perpetual motion" machine at once.

Notwithstanding these differences in calculations, Mr. Summers is certainly correct in calling attention to the danger in high speeds over the track he describes, and I have no desire to disparage his design of truck.

Since the tender frame and the truck bolsters are held in the same relative positions, notwithstanding the location of the side bearings, it is difficult to see how the spacing of them can have any effect upon tender derailments. The thousands of six wheel trucks and of recent four-wheel trucks for steel cars, having side bearings far outside the journals, carrying loads with high centers of gravity, have reputations for safety which cannot be assailed.

FROM MR. SUMMERS.

Under date of November 25, 1912, E. W. Summers, president of the Summers Steel Car Company, Pittsburgh, Pa., wrote as follows:

I am pleased to have the criticism and endorsement of Prof. Lewis E. Moore, of the Massachusetts Institute of Technology, as published in your issue of November 15, 1912, page 919, on my tender derailment articles.

This computation, coming from one of his position and standing, in such an institute as "Boston Tech.," should be accurate and be received as such by the readers of these communications. I have not attempted to make an accurate calculation of the forces set up and am willing to accept the results as found by Professor Moore. I can not agree with some of his assumed conditions; viz. (1) that "If the obstruction is practically unyielding, it will cause the wheel to rise over it. When the center is directly above the obstruction, the wheel will be moving in a direction parallel to its original direction, in that case, horizontal." (Italics mine.) It will not do this, its trajectory at that high velocity will be a curved line for a distance after the center of the wheel is directly above the obstruction. (2) Quoting from Prof. Moore's communication, second column, page 920, "The actual fact of the matter is that the center of gravity of the train and of each car of the train must move in a practically straight line on straight track of uniform grade. The rocking which is so often noticed is caused by a transverse rotation of the car about its own center of gravity, the center of gravity itself moving in a straight line." (Italics mine.)

If you have a straight track of uniform grade, the car will move in a straight line parallel with the track. The irregularities in supposedly straight track cause the car to rock, pitch, twist, pound and do all kinds of stunts. There is a tendency to rotate about its own center of gravity when a force is applied at one side of its center of mass, and this undoubtedly is what happens within the limitation of the possible lateral movement between the parts of the truck and the car body or tank.

In Fig. 2 is a cross section through an ordinary tender tank and center bearing truck. Fig. 3 shows the same tank in cross

**Railway Age Gazette*, October 11, page 667; October 18, page 723; October 25, page 783; November 8, page 874; November 15, page 919; December 13, page 1130. See also article by A. Stucki in the issue of January 17, 1913, page 111.

†*Railway Age Gazette*, October 25, 1912, page 783.

section carried on a balanced side bearing truck. In each case the center of gravity of the tank and its load, exclusive of the truck, is located at about 7 ft. above the rail. In Fig. 2 the center of gravity is 4 ft. 8 in. above the center plate and 3 ft. below the top of the tank. The tank is often known to sway sideways at the top from 4 to 6 in. each side of its central position. In the illustration it is shown 5 in. to one side. If this rotation was to take place about its center of gravity, the bottom of the tank or the center plate would have to move sideways in the opposite direction about $7\frac{3}{4}$ in. This is a physical impossibility; only a small part of $7\frac{3}{4}$ in. movement can take place through the play of parts of the truck.

In Fig. 3 there is no center support, and a lateral movement can take place. The maximum movement of $2\frac{3}{4}$ in. is shown, but this does not occur when moving at high velocity. For slow movements the center of rotation is about the intersection of the

truck and the vertical hammering between side bearings, common with the ordinary center bearing truck, is entirely eliminated.

The vertical reaction of 352,000 lbs., and the horizontal one of 86,000 lbs., as found by Professor Moore, due to lifting 2,000 lbs. $\frac{1}{2}$ in. in $\frac{1}{264}$ of a second will have an increase limited only by the strength of the resisting structure when subjected to the condition shown in Fig. 2, if the left hand wheels are compelled to make an abrupt upward change in direction due to track conditions.

In Figs. 2 and 3, I have purposely chosen a tank having a height of top and center of gravity much lower than many that are in use, rather than to show extreme conditions.

Within the limitation of remaining on the track the results of excessive reaction are shown on the treads of wheels. Quoting the statement of a prominent steel wheel maker, as follows:

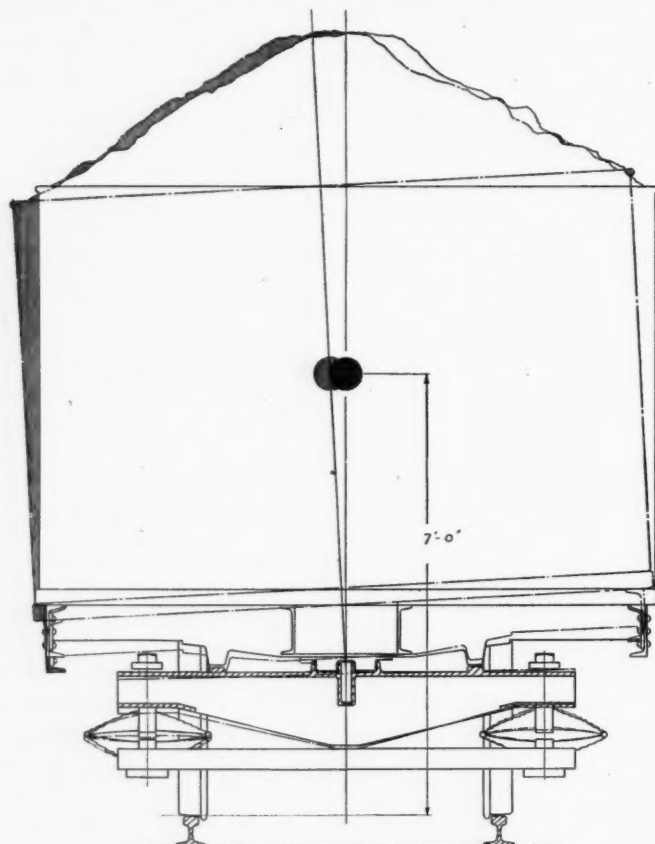


Fig. 2—Cross Section Through an Ordinary Design of Tender and Center Bearing Truck.

center lines of the inclined hanger bars extended until they meet above the center of gravity position of the tank.

A lateral movement of the heavy shaded parts of the truck can take place by reason of the horizontal springs which are attached to the king pin. The cradle member, upon the outer ends of which the car is supported through the inclined hangers, is pivoted about the king pin. On account of the inertia of the tank and its load, the center of gravity with this construction can and does move in a straight line when traveling at high velocity. The cradle moves sideways and the vertical truck springs give in such a way as to permit the tank or car body to actually rotate about its own center of gravity. This "phase of the question of dynamics" will bear close analysis.

With the side bearing truck illustrated in Fig. 3, the distortion of position shown by the shaded parts at the side and above the tank is that which the parts will assume when standing on a track having a warped surface of about 7 in. in the length of the tender, or from centers of trucks. This shows clearly the flexibility of connection between truck and tank. Rocking in the ordinary sense does not occur with cars carried on this kind of a

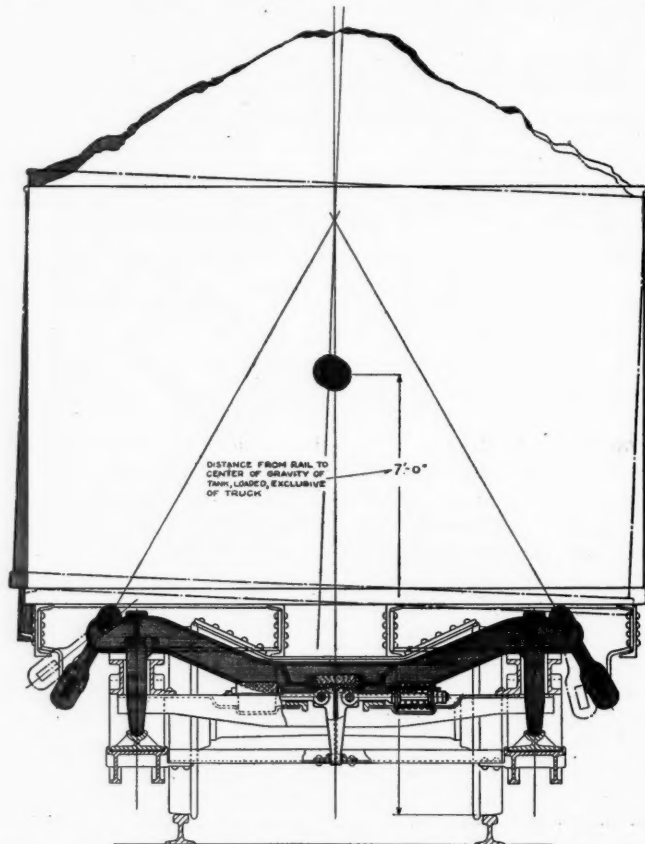


Fig. 3—Cross Section Through Tender With Balanced Side Bearing Truck.

"Over 90 per cent. of the trouble commonly known as 'shelling,' 'spalling,' or 'flaking' of wheels, no matter whether they are solid steel or steel tired wheels, occurs in connection with wheels in service under tenders."

PROF. MOORE ON THE WESTPORT WRECK.

Under date of December 10, 1912, Lewis E. Moore, assistant professor of civil engineering at the Massachusetts Institute of Technology, wrote as follows:

I have been thinking over the Westport accident in connection with my letter on tender derailments published in your issue of November 15, and have been particularly struck by the fact that the tender in this case left the rails at a point about as far beyond the crossover as the distance between the two curves in the crossover. The idea of rhythmic oscillations in cars, engines and tenders under certain conditions, which I advanced in the letter above referred to, is interesting in this connection. Let us consider for a moment what would happen under such circumstances. When the tender entered the crossover it would career sharply to the left, owing to its being carried on springs,

and also owing to its high center of gravity. In this position, the left hand wheels (on the outside of the curve *A*, Fig. 4) would be held hard down on the rails and the right-hand wheels would have the load materially lightened on them and might even raise from the rails, although I am quite certain they would not in the first oscillation. Raising from the rails would not, however, produce a derailment under these conditions, because the wheels on the *outside* of the curve would be held down hard on the rails. As the tender entered the curve *B* just before leaving the crossover, it would be recovering from its careen to the left and swinging to the right like an inverted pendulum. This curve to the left would accentuate the careen to the right, which the tender had already begun under the action of the springs in trying to resume their normal shape. This would cause the right-hand wheels to bear down hard on the outer rail of the curve *B*, and would probably lift the left hand

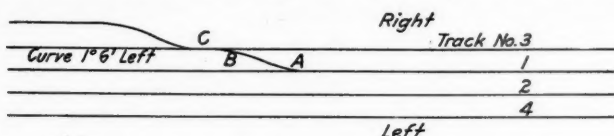


Fig. 4—Arrangement of Tracks at Westport.

or inner wheels up from the track for an instant, but would not cause a derailment, because of the fact that the *outer* wheels would be held down hard on the rails. The tender would then swing back again in a pendulum like fashion toward the left and ordinarily would come to rest after a series of oscillations. What may have happened on this swing toward the left in this Westport case is of interest. As the tender oscillated again toward the *left*, it started around a curve also to the left, and when it reached its extreme of oscillation at *C* was bearing heavily on the left-hand or *inner* wheel. The right-hand or outer wheels, upon which outer wheels devolved the duty of keeping the tender from leaving the rails, were *raised* a little; it need not have been over an inch from the track, for a passing instant, and of course could not longer perform their function of keeping the tender following the curve and the derailment occurred.

In support of this theory, I have endeavored to make a rough mathematical or rather mechanical investigation with the following results: In the first place, it would be impossible for the centrifugal force alone to raise the wheels from the track on a curve such as the one in this crossover. The weight of the tender was about 67 tons fully loaded, and if the radius of the curve in the crossover be taken as 900 ft., and the center of gravity of the tender be assumed as 8 ft. above the rail and the speed 45 miles an hour, or 66 ft. per second, the centrifugal

$$W \frac{v^2}{r} = 134,000 \times 66 \times 66$$

force would be $\frac{134,000 \times 66 \times 66}{32.2 \times 900} = 20,200$ lbs., and

the forces acting on the tender would be as shown in Fig. 5. This set of forces alone could not possibly cause derailment unless the rails should spread, which did not occur in the case under discussion. The tender is not, however, rigid on the wheels and the centrifugal force (Fig. 5) will push it over to the left compressing the left-hand springs and relieving the right-hand ones. The springs then try to assume their original shape, which has a tendency to make the tender oscillate to the right.

If the tender strikes a curve to the left of the 900 ft. radius at this time, the forces acting on the body of the tender will be as shown in Fig. 6. The wheels and springs are removed in this figure and the tender body above the springs is shown diagrammatically. The vertical forces are unbalanced as far as rotation about the center of gravity is concerned and tend to turn the tender in a right-hand direction, *aided now by the centrifugal force*. The result of this combination of forces is that the distance through which the tender will oscillate before the springs stop it is much greater than before, and probably will be enough to lift the left-hand wheels off of the track, but will not cause a derailment because the right-hand wheels keep it

following the curve. At the extreme point of the oscillation, the tender will be in the position shown in Fig. 7. If the track be straight from this point on, the action of the springs will be to rotate the tender to the left, compressing the left-hand springs and reducing the pressure on the right-hand ones until very likely the right-hand wheels will be lifted off the track and the forces will be as shown in Fig. 8. If, however, a curve to the left be encountered during this oscillation, the tender will surely leave the track when the right-hand wheels lift, as it depends upon the flanges of the right-hand wheels to make it follow the curve.

For the action outlined above to occur as shown the time of oscillation of the tender must be such that the springs will be throwing the tender to the right when the curve *B* is struck. If the elapsed time interval be great enough for the tender to have swung from left to right and to have started back to the left again as the tender enters the curve *B* the centrifugal force and the action of the springs will mutually counteract each other, and the tender will be steadied by the curve *B* instead of being made to oscillate more violently.

In this case the distance from the beginning of the crossover to the point of derailment was about 260 ft., with the end of the crossover a little over half way from the beginning of the crossover to the point of derailment. In this distance the tender would make about $2\frac{1}{2}$ oscillations, a half one first to the left, then a full one to the right and a full one to the left, or one full swing in about 100 ft., or say $1\frac{1}{2}$ seconds at a speed of 45 miles an hour.

If the radius of gyration of the tender about its axis of rotation were about 7 ft., the time of vibration *T* would be

$$T = \pi \sqrt{\frac{K^2}{ag}}$$

where K^2 = the radius of gyration of the tender about its axis of rotation.

a = distance from center of gravity of tender to axis of rotation.

g = acceleration of gravity, or 32.2 ft. per second per second.

For our purposes, considering the approximations that we must make, *K* may be taken equal to *a*, and if both be taken as 7 ft.

$$T = 3.14 \sqrt{\frac{7 \times 7}{7 \times 32.2}} = 1.46 \text{ seconds.}$$

The value of 7 ft. for the radius of gyration is entirely reasonable, owing to the fact that the centrifugal force, acting as it

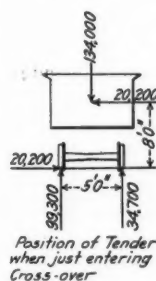


Fig. 5.

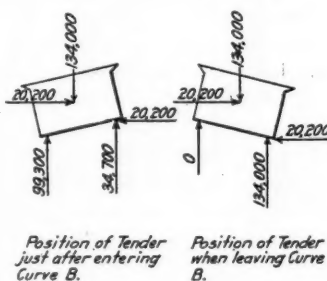


Fig. 6.

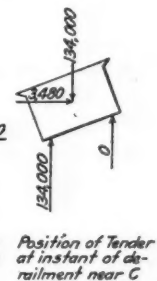


Fig. 7.

Fig. 8.

does through the center of gravity, gives the tender a translatory motion sidewise which combines with the spring action to cause rotation about a "virtual axis" below the center of gravity of the tender, and thus makes the radius of gyration greater than that about the gravity axis of the tender.

Of course the centrifugal force on the curve after leaving the crossover will tend to counteract the swing of the tender to the left, but this force is comparatively small, being only

$$\frac{134,000 \times 66 \times 66}{32.2 \times 5,200} = 3,480 \text{ lbs.}$$

and will be overcome by the reaction of the springs.

The sloshing of the water in the tender will, of course, make

an exact solution impossible, but it should be noticed that the action of the water will augment the effects pointed out above. As the tender strikes the right hand curve *A*, the water will slosh over to the left, then to the right as the left-hand curve *B* is struck, and then to the left in an attempt to seek its level after coming out of the crossover. It would just about be clear over to the left of the tender again at the point *C*, where the wheels left the rails as its oscillation also would be rhythmic.

This solution is different from that in the report, but it only requires the wheels to lift less than an inch, whereas the solution given in the report* required the wheels to lift a foot off of the rails and to run for some distance in that position. The centrifugal force could not possibly do this unaided in this case unless it produced oscillations similar to those herein outlined. The report states that the tender was careened to the right and remained in this position while it was "going from the west end of the crossover to the point where the main rail meets the facing switch." If this were the case and it was careened as much as the report assumes, why did it not leave the track where the trailing point of the crossover met the stock rail of track No. 3? The extra width of rail head necessary to produce a derailment under the theory outlined in the report existed at this point.

If the oscillation theory I have given is correct, as I am sure it is, the only effect the facing point switch from track No. 3 to the siding had on the wreck was to deflect already derailed wheels further from the main track.

SUPREME COURT SUSTAINS NEW ORLEANS-MOBILE RATE REDUCTION.

The decision of the Supreme Court in the case of the Interstate Commerce Commission against the Louisville & Nashville, in which the commission appeals from the decision of the Commerce Court, in the New Orleans rate case, was noticed in last week's issue, page 185. The Commerce Court disapproved the commission's order reducing freight rates from New Orleans to Mobile and Montgomery. The commission is now sustained in its decision that the road, having maintained low rates for many years, is bound to continue them, having failed to show sufficient reason for an advance which was made in 1907. The Commerce Court held that the commission had reached its decision without giving proper weight to the evidence; but the Commerce Court is now overruled.

The decision of the Supreme Court, handed down by Justice Lamar, January 20, deals with the subject under nine heads. Under the first he emphasizes the right of all parties to a rate controversy to have a full hearing. A finding without evidence is arbitrary and baseless. The plea of the government, in behalf of the Interstate Commerce Commission, if allowed, would mean that the commission had a power possessed by no other officer, administrative body or tribunal under our government. The commission could disregard rules of evidence and capriciously make findings by administrative fiat. Such authority is inconsistent with rational justice and comes under the constitution's condemnation of all arbitrary exercise of power. Ten decisions are cited to the effect that administrative orders, quasi-judicial in character, are void if a hearing was denied; or if that granted was inadequate or manifestly unfair, or if the finding was contrary to the indisputable character of the evidence.

2. The Interstate Commerce law calls for methods of procedure that "conduce to justice."

3. After hearing, the commission may set aside a rate shown to be unreasonable. If there was no evidence to show unreasonableness, there was no jurisdiction to make the order. The court will not review the commission's conclusions of facts by passing upon the credibility of witnesses or conflicts in the testimony; but the legal effect of evidence is a question

of law. A finding without evidence should be set aside "by a court of competent jurisdiction."

4. The law requires the commission to obtain information [without hearings] to perform its duties; but, says the court, such information, while properly used as a basis for instituting prosecutions and for other purposes, is not available where a party is entitled to a hearing. The fact that the commission is not limited by strict rules as to the admissibility of evidence makes it all the more obligatory to preserve the essential rules of evidence. The commissioners cannot act upon their own information as could jurors in primitive days.

5. There was water competition from New Orleans to Mobile, from the beginning, when the road was built, in 1871. In 1887 the rate from New Orleans to Montgomery was adjusted in accordance with the award of Judge Cooley. This award took into consideration rates from points on the Mississippi river in Kentucky to Montgomery, and in certain other territory. The increases which are the subject of controversy were made in 1907. The decision discusses only typical rates. The through rate on class 3, from New Orleans to Montgomery, 68 cents, was 13 cents higher than the combination of the locals from New Orleans to Mobile, 25 cents, and Mobile to Montgomery, 30 cents. New Orleans merchants, to get the advantage of the lower rate shipped goods to Mobile, had them unloaded and then reshipped to Montgomery. When the commission ordered that the through rate should not exceed the sum of the locals the road advanced the local from New Orleans to Mobile from 25 to 38 cents. On December 31, 1909, the commission directed the old locals to be restored, and a corresponding reduction made in the through rate. In evidence before the commission were reports of the railroad company showing earnings and expenses in detail, and tariffs of other railroads for comparison. The commission took the testimony of merchants from New Orleans who had lost business by the increase in rates. The commission found that the rate per ton per mile to Montgomery was higher from New Orleans than from Memphis; that many departures had been made from the Cooley award, and that westbound rates to New Orleans had not been increased. It was held that the old low local rate out of New Orleans had been so long in force as to create a presumption that it was reasonable and compensatory.

6. The court holds it not necessary to review all of the facts in the suit; only the most salient points are mentioned. The validity of the commission's order does not necessarily depend upon the correctness of all of the findings. The question is whether there was substantial evidence to support the commission's order.

7. In the conflict of evidence as to whether comparisons with other rates were proper, the court holds that the value of such evidence varies according to circumstances, but the weight to be given to it is to be decided by the body experienced in such matters and familiar with the complexities, intricacies and history of rate making in each section of the country. As to whether the lower rates westbound were justifiable, the commission was authorized to judge.

8. The abnormally low rate forced by water competition furnished no just standard of reasonableness. Water competition was not potential for some years prior to the increase made in 1907. When made, the increase was not because of the absence of water competition, but to make the sum of the locals correspond with the through rates.

9. The reduction ordered by the commission will upset the Cooley award, under which rates had been adjusted throughout a large section; but that was a matter properly to be decided by the commission. The commission's order was not arbitrary, but was sustained by substantial, though conflicting evidence. The courts cannot settle the conflict, nor put their judgment against that of the rate making body; and the decree of the Commerce Court is, therefore, reversed.

**Railway Age Gazette*, November 29, 1912, page 1035.

THE USE OF HIGHLY SUPERHEATED STEAM.

As the Demands for Power Are Increased in the Operation of a Superheater Locomotive, the Efficiency Increases.

By GILBERT E. RYDER.*

Since the success of the locomotive superheater became established in this country, about 2½ years ago, there have been over 6,000 applied to new and existing locomotives in operation on more than 100 railroads. The type best adapted to American practice has proved to be the fire tube superheater furnishing steam with from 200 degs. to 250 degs. superheat. With this high degree of superheat the steam has a specific volume roughly 30 per cent, larger than that of saturated steam at the same pressure. In passing from the superheater into the cylinders some of the superheat is lost and the specific volume is reduced to a point approaching that of saturated steam. There is, however, at the moment of cut-off, or at the point where the expansive action of the steam commences, fully 100 degs. of superheat in the steam, which is enough to carry it through the expansion and out the exhaust without any condensation. The entire elimination of all losses through condensation, together with the somewhat increased specific volume of the steam, effects, under average conditions, a saving of 30 per cent. in the steam consumption per indicated horsepower and a corresponding saving in fuel of 25 per cent. as compared with a saturated locomotive of the same type, operating under the same conditions.

The increase in hauling capacity is obtained by the increase

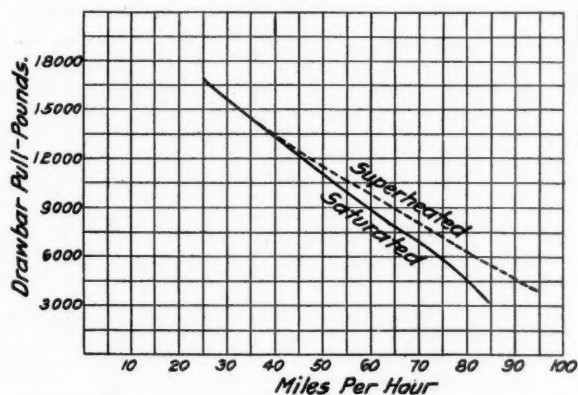


Fig. 1—Drawbar Pull of Saturated and Superheated Steam Locomotives.

in efficiency of the locomotive, made possible principally by the entire elimination of condensation and in a small part by the increase in specific volume of the steam. To illustrate the increase in drawbar horsepower obtained, it is convenient to assume two locomotives of the same dimensions and working under the same conditions of boiler pressure, cut-off and speed, developing the same indicated horsepower, one using saturated steam and the other using highly superheated steam. Under average conditions the superheater locomotive will burn at least 20 per cent. less coal per indicated horsepower. Then, if the same amount of coal is burned in the superheater engine as in the saturated engine, and if the efficiency of the boiler is the same, and the engine efficiency remains constant, the indicated horsepower developed would be 25 per cent. more than that of the saturated engine. That is, if a given amount of coal is burned in a superheater locomotive, say 80 lbs., a certain horsepower will be developed; then, in order to develop the same power, 100 lbs. must be burned in a saturated locomotive.

Only about 70 per cent. of the cylinder power, or the indicated horsepower, is available at the drawbar of the tender in the operation of saturated steam passenger locomotives at average

speeds. By the addition of the superheater, the weight, dimensions, etc., of the locomotive are not changed materially and therefore, its efficiency as a whole, will increase over the saturated locomotive at corresponding speeds, because the cylinder power is greater, while the actual machine and tender friction remain practically constant. For example, a saturated locomotive developing 1,000 h. p. at the cylinders on a given amount of coal, 30 per cent, or 300 h. p., being consumed in the engine and tender, will have available at the tender 700 drawbar h. p. A superheater locomotive of the same dimensions operating at the same coal rate, will develop 1,250 h. p. at the cylinders. The loss between the cylinders and the drawbar will practically remain the same, or 300 h. p., which will leave 950 h. p. available at the drawbar, which is approximately 35 per cent. greater than that developed by the saturated locomotive. This example shows clearly what increase in hauling capacity is possible by superheating. Results of test and road conditions have verified these figures many times.

It requires greater cylinder power to maintain a certain drawbar horsepower at the higher speeds. When the saturated locomotive has reached its limit in indicated horsepower, the superheater locomotive still has a margin in cylinder power because of the lower steam rate and consequent increased boiler capacity. In other words the engine efficiency, or the percentage of the indicated horsepower which is available at the drawbar, varies with the speed at which the locomotive is operated. The hauling capacity of the locomotive at different speeds depends on the tractive effort that can be developed and sustained at these speeds. The maximum sustained tractive effort depends in turn primarily on the boiler capacity. To show the supremacy of the superheater locomotive, as far as sustained tractive effort is concerned, the curves in Fig. 1 compare the drawbar pulls in pounds of a saturated and a superheated locomotive of the same general dimensions, at speeds ranging from 25 m. p. h. to 84 m. p. h. for the saturated locomotive, and to 95 m. p. h. in the case of the superheater locomotive. At 80 m. p. h., the sustained tractive effort of the superheater locomotive is about 33 per cent. above that of the saturated locomotive, and represents the increased hauling capacity available at the drawbar at this speed obtained by the use of highly superheated steam. In connection with these curves it is interesting to note that the limit in speed of the saturated locomotive with the train that it was pulling was very nearly reached at 85 m. p. h., indicated by the fact that the curve falls rapidly from 75 to 85 m. p. h. The same reference to the other curve would indicate that the limit of the superheater locomotive with its train, which was the same weight, was not reached at 95 m. p. h., the conditions limiting the speed probably being those of track, rather than that of insufficient boiler capacity.

The supremacy of the superheater over the saturated engine, or the increased hauling capacity obtained by it is clearly shown by a comparison of the curves in Fig. 2. While they show the drawbar horsepower of the saturated and superheater locomotives sustained at various speeds, considered in Fig. 1, they are representative of results that may be expected by the introduction of the superheater. The maximum drawbar horsepower of the saturated engine was developed at about 33 m. p. h., while the superheater locomotive developed its maximum drawbar horsepower at 50 m. p. h.

The increased hauling capacity realized in actual service by the use of highly superheated steam varies widely. The ton mile basis, however, which is generally used, is not altogether reliable and does not show the true increase in hauling capacity

*Locomotive Superheater Company, New York.

that is obtained. For example, we may consider a saturated locomotive operating a train of eight cars, weighing say 500 tons, over a 100 mile division, which would represent 50,000 ton miles. By the introduction of the superheater it is found possible to haul ten cars over the same division in the same time, burning the same amount of coal. When the superiority of the superheater locomotive is considered on the ton mile basis, the increase in ton miles, due to the superheater, in this case is 20 per cent., while in reality, there may have been many points on the division where the superheater locomotive was developing a drawbar horsepower much more than 20 per cent. in excess of that developed by the saturated locomotive.

In order to utilize to the fullest and most economical extent, the increased capacity of the boiler obtained by the superheater, the diameter of the cylinders should be increased in proportion to the increase in boiler capacity. It is not enough to merely increase the cut-off or the length of admission, because if this only is done, the steam will not be used at the same efficiency. That is, the cut-off coming later in the stroke, the steam does not have an opportunity to expand through the necessary range to insure its most economical use. The terminal temperatures and pressure are high, and consequently, the losses are greater. When superheaters are applied to existing locomotives the adhesive factor and the strength of the parts to withstand the greater piston thrusts must be taken into account. It is generally possible to increase the cylinder diameter to some extent without danger. This fact makes the superheater an economical remedy for locomotives where cylinders are too large for the boiler, or, in other words, for locomotives deficient in boiler capacity.

In the rating of locomotives the boiler capacity is in most cases either directly or indirectly the limiting factor and the maximum starting effort that the locomotive is capable of exerting is of secondary importance. Passenger locomotives and freight locomotives into the rating of which the speed element enters, are rated according to the ability of the boiler to furnish steam and maintain a certain tractive effort at the desired speed. The maintained tractive effort is only a fraction of the maximum starting effort of the locomotive, so that in almost all cases, it may be said that the tonnage rating is in reality based on the capacity of the boiler. Then, inasmuch as the increased hauling capacity is based upon the ability of the boiler to furnish sufficient efficient steam, the superheater installed in the boiler provides a reserve source of power which is amply sufficient to meet the demands that are made upon it. In fact, it has been said that the superheater locomotive cannot be overloaded, but that it will pull all that it can start. It is also a fact, that as the demands for power are increased in the operation of the superheater locomotive, the efficiency increases, which makes it possible to "beat it," under conditions where a saturated locomotive must be favored.

All parts of the locomotive require a certain amount of attention in order that they be properly maintained. There are, however, some parts, the maintenance of which is more vital to the efficiency of the engine than others. The superheater may be considerably neglected without resulting in a complete engine failure, but any neglect will affect its efficiency and the ultimate results in economy that may be realized will not be obtained. One instance, which I recall was that of an engine in passenger service, running out of Chicago. For some time this engine had been reported as not steaming well. The front end was examined and there were found to be three holes each of about $\frac{1}{8}$ inch diameter in the unit pipes, having been cut by the action of the steam from a leak in the front flue sheet flange. Had there been a leak of this size in the steam pipe of a saturated engine, it would have been impossible to operate at all. The superheater locomotive, however, had a sufficient margin in steam capacity to make the schedule time over the division, although the economy that should have been obtained was not being realized. This incident is mentioned to bring out the importance of making periodical inspections and tests

of the superheater, and particularly of the front end, in order to find any leaks that will affect the economy of the operation before they have become so large that the engine must be taken out of service to repair them. The practice of making an inspection every thirty days will insure a better economy in the performance of the engine, as well as prevent any small leaks becoming so large as to necessitate extensive repairs.

Another point to be carefully watched in the maintenance of the superheater locomotive is that of keeping the large flues clean so that the flow of gases through them will not be retarded or altogether stopped. The water heating surface in the boiler of the superheater locomotive is less than that of the boiler of the same design for saturated locomotives, and the large flues constitute a large percentage of this surface. The flue cleaning periods cannot be fixed to apply to all operating conditions; the quality of the coal used principally governs the fixing of these periods.

From a maintenance standpoint, the care of the flues necessitates the use of the flue roller, prosser expanders and beading tool. In using these tools, experience has proved that the prosser should be given the preference, using the roller only when absolutely necessary, and omitting the beading process

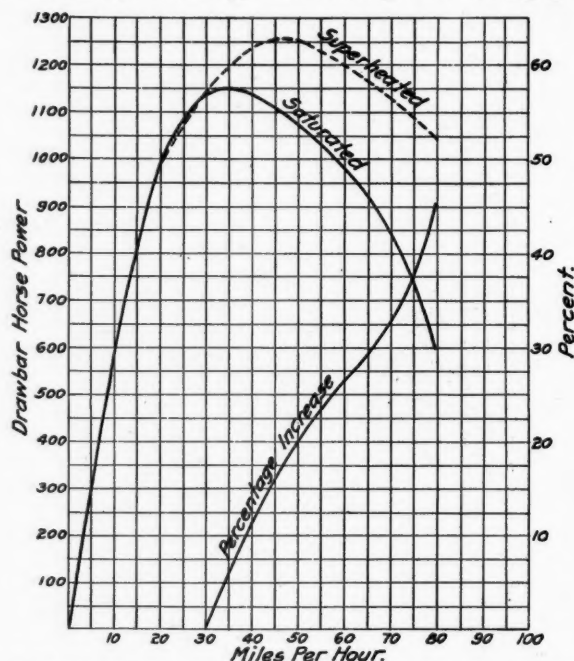


Fig. 2—Drawbar Horse Power of Saturated and Superheated Steam Locomotive at Various Speeds.

unless the condition demands that it be used. The designs of tools that have given the best satisfaction in carrying out this work, are the roller consisting of five rolls, and prosser of not less than twelve sections. Specific flue conditions, of course, demand that specific methods be used in caring for them, but the above applies in general.

The firing should be light and regular, on account of the fact that the coal economy is improved by the superheat, thereby necessitating the burning of a smaller amount of coal to develop the same power. The aim of the fireman on a superheater locomotive, in order to get the best results, and to make the work easier for himself, should be to maintain a fire that will result in the highest firebox temperatures. This practice will insure, as far as combustion is concerned, the highest degree of superheat and therefore, the best efficiency for the locomotive. In running locomotives equipped with superheaters the engineer should, in addition to satisfying himself that all parts are operative, carry the water in the boiler as low as operating conditions will permit.

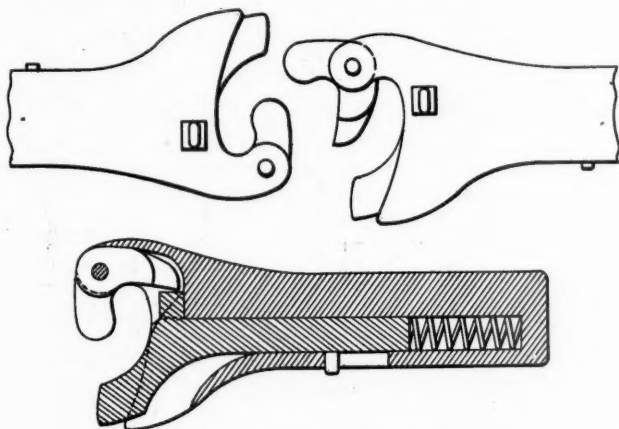
DISCUSSION.

In the discussion of Mr. Ryder's paper special emphasis was laid on the necessity of keeping the superheater flues clean and

of having the engine house foremen enforce this rule. The Chicago & North Western provides its inspectors and flue cleaners with flash lamps for this purpose. The greatest economy of superheater locomotives has occurred on long hard passenger runs. It was the consensus of opinion that it would pay to replace the slide valves with piston valves on old power in order to use superheated steam. In some cases this has been done without making an entirely new cylinder casting. The fact was also brought out that the stroke of an engine could be made shorter when superheated steam is used. The superheater damper has been removed on some locomotives, but it has been found that the superheater tubes deteriorate more rapidly when this is done.

A NEW DESIGN OF CAR COUPLER.

The aim of the inventor of the Stark coupler, which is shown in the illustration, was to obtain a coupler which would be automatic in all coupling conditions. The principal feature of the device is the plunger shown in the sectional view. This is intended, when struck by another coupler, to compress the spring at the bottom of the pocket and permit the opposing knuckle to enter. When pulling, the tongue of the knuckle forces the lock-



New Design of Automatic Coupler.

ing pin against the plunger and a series of corrugations on the faces between the plunger and the locking pin prevents the plunger from moving. It is claimed for this coupler that with the two knuckles in any relation whatever, there is no difficulty in coupling cars on either straight track or track with any degree of curvature. It is patented by C. H. Stark, Strasburg, Virginia.

VICTORIAN RAILWAY DEVELOPMENT PLAN.—Hitherto it has been the policy of the Victorian Railway Commissioners to construct lines on routes favorable to immediate profit bearing on the capital outlay. In order, however, to assist remote and isolated districts the government recently introduced into the Legislative Assembly a bill entitled The Developmental Railway Bill. The object of this bill is to permit the construction of lines in isolated districts even where the lines are likely to be operated at a loss for a number of years. Power is to be given to the Legislative Assembly to order the construction of one of these proposed lines at a time. A fund is also to be accumulated from the money received from the sale of Crown lands and added to that now in hand for the railway construction account, and this will be devoted to meeting deficits arising out of the working expenses and the interest on cost of construction for a period of 20 years. The bulk of the permanent way and other materials, rolling stock, etc., will more or less be provided locally, but there are certain types of plant, machine tools, etc., which will have to be imported for the local repair shops on the route.

General News.

The Wabash Railroad has increased the pay of shopmen in most cases from 6 to 10 per cent.

The Pennsylvania Railroad has notified all of its connections, and also the Pullman Company, that wooden sleeping cars will no longer be accepted to be moved in Pennsylvania trains.

A full crew bill has been introduced in the legislature of New Mexico requiring an additional brakeman on passenger trains of more than five cars, and freight trains of more than 40 cars, and a fireman's helper on Mallet engines.

The Georgia Railroad, after extended conferences, has raised the pay of conductors and trainmen, about 300 men altogether. Train porters and switchmen are included in the advance. Many of the men will receive 10 per cent. increase, and some of them more than that.

A hearing before a master in chancery was begun at Chicago on January 27 in the suit by the federal government against several Oregon and California railways to cancel land grants of timber property on the ground that the railways have violated their government contracts for the disposition of the lands.

A. L. Ruthven, inventor of an automatic train stop, has been tried in the Federal court at New Orleans and has been convicted and sentenced to three years imprisonment in the Federal prison at Atlanta, Ga., for using the mails to defraud. He was selling stock at two dollars a share. Ruthven was also indicted in Canada.

The Clinchfield Railway Club has been organized with a membership of about 250 employees of the Carolina, Clinchfield & Ohio. All classes of employees are eligible to membership. The club has leased rooms at Erwin, Tenn., including two reading rooms and a hall, which will be provided with railway and general literature, newspapers and periodicals.

Isaiah Hale, safety commissioner of the Atchison, Topeka & Santa Fe, has announced a series of free lectures and entertainments for employees of the company, with moving pictures, lantern slide, music, readings and talks on the value of "Safety First," to be held at various towns on the lines of the road during the next two months. The moving pictures will illustrate accidents to trains and in shops and yards.

A committee of the Indiana senate has been holding hearings on a proposed bill providing for the separation of grades on the railways of the state, requiring the road community to pay 25 per cent of the cost and the railways the other 75 per cent. It is provided that the railway commission shall not make more than one order of this kind against a railway in any one year, and that no more than one grade separation shall be ordered for each 200 miles of track.

The Northern Pacific has offered to give its abandoned right of way and old roadbed between Tacoma, Wash., and Vancouver to the state of Washington for the proposed Pacific automobile highway. The property cost the railroad company more than \$2,000,000, and the consideration asked is \$1. The company had intended to build four steel bridges across the Cowlitz and Tottle rivers. The substructures for these bridges are in good condition and would be available for bridges for the proposed highway. Some of the roadbed has stood for 30 years and there is a graded right of way on which \$1,000,000 was spent in 1899 and 1890.—*Exchange*.

As was noted last week the conductors and trainmen of the principal eastern roads are presenting demands or requests for increases of pay. In Canada, according to the press despatches, this movement is participated in by the enginemen as well as the conductors and brakemen; but the committees of employees will not call upon the officers of the Canadian roads for some little time yet. On the Bangor & Aroostook, where the enginemen struck last week, the conductors and trainmen are now demanding an increase in pay. The B. & A. relieved the congestion of freight on its line last Sunday, and seems likely to be able to vanquish the striking enginemen and firemen.

The New York Railways Company, operating surface street railways in New York City, has announced an increase of pay

of employees which aggregates \$150,000. The general manager, in announcing this increase at a social meeting of employees, said that the company intended also to establish a number of stores at which the employees could buy the necessities of life at cost. These stores will be available not only for the employees of the New York railways, but also for those of the Interborough Rapid Transit Company, the lines of which are operated in the same interest. The first store will be at Fiftieth street and Eighth avenue, Manhattan.

A statistician in Pennsylvania calculates that in the year 1912 120,000,000 tons of water were pumped out of the mines of the Lehigh Valley Coal Company, about 15 tons of water for every ton of coal produced. This is believed to be about the average proportion for all the companies operating in the anthracite region. The output of water from the Pennsylvania anthracite mines long ago overtook and passed the output of coal, but no one thought twelve or fifteen years ago that the pumping problem would be as serious as it now is. The cost of pumping is one of the most important elements in the increased cost of mining. As the richer and more accessible veins of coal have been exhausted, shafts have been sunk lower and lower. In his last annual report the chief of the Pennsylvania Department of Mines gives the number of pumps used for pumping water out of the anthracite mines as 901, and their total capacity as 929,248 gallons a minute.

Indiana, the legislature of which is one of the most fertile fields for new railroad laws, is coming to the front in good shape for 1913. Representative Cunningham, of Miami county, proposes to compel railroads to install "automatic fireboxes" on locomotives! If this scheme should succeed we may next hope, perhaps, to have some legislative provision which will automatically deal with hot boxes—preventively. Two bills have been introduced to require railroad companies to pay employees twice a month. There is a movement among employees in opposition to this proposal, but certain employees drawing moderate pay say that the opposition comes from a few railroad men who receive high pay and who, therefore, can readily get credit at the stores for a month at a time. The Brotherhood of Railway Trainmen is fathering a bill to regulate the promotion of brakemen and firemen to the position of conductor and engineman, by requiring two years' experience in each case.

George Bradshaw, general safety agent of the New York Central Lines, has issued to the members of the safety committees on those lines a circular letter asking each member, on all of the committees, to speak, within thirty days, to three employees in his own branch of service, explaining briefly the purpose of the safety movement. Committee members are asked to impress on the individual the importance of the rules and regulations, to call attention to typical risks and to cite examples which will impress the argument presented. And each person spoken to is to be requested in turn to go and talk with three other employees; and thus Mr. Bradshaw's idea, if carried out, will soon extend the safety propaganda to everybody in the service. The New York Central Lines' committees now number sixty, and on them there are about 900 members; and although the movement was started only last May, Mr. Bradshaw feels highly gratified with the results already accomplished.

For the second time in their history—of 35 years—the elevated railroads of Manhattan, New York City, have had a train accident in which a passenger was killed. This was a rear collision on the Third avenue line Saturday afternoon, January 25, the leaving train being at a standstill. The other was running slowly but the rear car of the leading train and the front car of the following one were badly crushed at the ends, and a policeman riding in the second train, sitting immediately behind the motorman's box was stunned, and his body was jammed under the seat in the motorman's box. The car took fire immediately from a short circuit and it is believed that the policeman was burned to death. From the testimony of a passenger it seems that the motorman had neglected to keep a good lookout, the train ahead having been in sight for some distance. Seven years ago a number of passengers were killed at Fifty-third street and Ninth avenue, when a car fell off the elevated structure because of too high speed on a sharp curve. Aside from that case the present is the first train accident in which a passenger has been killed. For many years these roads have carried over 500,000 passengers a day, and many times a million in one day.

Governor Advocates State Ownership of Pere Marquette.

Governor Ferris of Michigan has been quoted in the newspapers as urging that the state take over the ownership of the Pere Marquette.

"My legal knowledge on the subject of state ownership of railroads is exceedingly meager," he said, according to the reports. "But under certain conditions, it seems to me, it would be wise for Michigan to own the Pere Marquette Railroad. This system, so called, forms a network throughout Michigan. If the state can legally take over this road it would be a godsend to the people. Furthermore, Michigan could then furnish a practical illustration of public ownership."

Government Report on Montz Collision.

The Interstate Commerce Commission has issued the report of Chief Inspector Belnap on the rear collision on the Yazoo & Mississippi Valley, at Montz, La., November 12, in which 15 passengers were killed and 249 were injured. The report contains a detailed statement of the circumstances attending the collision, but contains only a few items of importance in addition to facts already published. It appears that the flagman, whose neglect was the immediate cause of the collision, and who was only 19 years old, had worked for the company about six years and had been employed as a section foreman for two years before he entered the train service. The engineman of the freight train, who was held responsible for running much faster than 25 miles an hour, the limit of speed prescribed for his train, had been in service since 1900 and had been engineman since 1906. He had been disciplined twice for responsibility for collisions; in April, 1908, and December, 1910. Mr. Belnap calls attention to the fact that the ten minute time interval prescribed by the rule does not afford safety at night when open telegraph offices are long distances apart. Referring to the reason given by the road for not using the block system—that all the available money was being used on portions of the road where traffic conditions more urgently required the block system, he says: "This argument, of course, applies only to the automatic block system. There is no reason why a manual block system could not be introduced on this division, the maintenance of a few more night offices being all that would be required to secure the additional factor of safety afforded by such a block system."

An Automatic Train Stop on the H. & B. T. M.

The Huntingdon & Broad Top Mountain Railroad (which connects with the Pennsylvania at Huntingdon, Pa.) has in experimental use an automatic train stop, which has been installed by the Safety Block Signal Company, of Atlantic City, N. J., of which the secretary is W. F. Shaw.

Carried on the locomotive is a contact wheel which, at each signaling point, comes in contact with a rail or ramp, fixed on the sleepers between the rails, in such a way that the wheel is slightly lifted. In its upward movement this wheel actuates a valve which causes the movement of a piston, in a pneumatic cylinder, so arranged as to shut off steam and apply brakes; this in case the block section ahead is occupied and it is desired that the train be stopped. If, however, the block section is clear, an electric current, from a battery at the roadside, passes through the ramp and the contact wheel and energizes an electro-magnetic valve on the engine which prevents the operation of the piston which, if not thus held, would apply the brakes. The general principle, it will be seen, is similar to that of the cab signal used on the Great Western Railway of England. After an engine has been stopped by the automatic apparatus, the engineman can release the brakes; but only after disturbing a recording device, which will record the fact that he has taken such action. Mr. Yohn, superintendent of the road, informs us that satisfactory tests were made with the apparatus December 27. Two locomotives are equipped with this stopping mechanism.

Earnings of the Steel Corporation.

The report of the United States Steel Corporation for the quarter ended December 31, 1912, shows that the total net earnings were \$35,185,557, after deducting all expenses incident to operation, including those for ordinary repairs and maintenance of plants and fixed charges of subsidiary com-

panies. This figure was about as expected. For the full year, net earnings aggregated \$108,178,307, an increase of \$3,872,841 over the preceding year. Notwithstanding this increase in net earnings, the surplus of \$3,610,129 was \$1,055,366 less than reported in 1911. This was due to an increase of \$4,828,729 in depreciation and sinking funds on bonds of subsidiary companies. Last year the Steel Corporation earned approximately 7 per cent. on the preferred stock, and 5¾ per cent. on the common stock. The surplus reported for the last quarter of 1912 amounted to \$7,410,979, which after deducting a net deficit for the three previous quarters of \$3,800,850, left a balance of surplus for the year 1912 at \$3,610,129. For the last two years the surplus has aggregated only \$8,200,000, and outlays for new construction have amounted to close to \$80,000,000. No appropriations from earnings for new construction have been made during that time. The net earnings for the last quarter were divided as follows: October, \$12,485,412; November, \$11,120,749; and December, \$11,579,396.

Conditions of Firemen's Wage Controversy.

Elisha Lee, chairman of the committee representing the fifty-four eastern roads in negotiations concerning wages, has issued a circular calling attention to a statement which has appeared, in connection with the firemen's strike vote, to the effect that the responsibility for failure thus far to arbitrate the matters in controversy rests upon the railroads and not on the firemen. This statement, made under the authority of the leaders of the firemen, has been sent out with the blanks for ballots. [The ballots are to be returned February 10.] To confute it Mr. Lee says:

1. The railroads are prepared to apply to the firemen—and have already communicated this to their committee—the conclusions embodied in the award of the board, which, to the satisfaction of the country, recently arbitrated the differences between the locomotive engineers and the railroads. The roads have also signified their willingness to grant certain increases in wages.

2. The railroads are prepared to arbitrate the present case independently by a board of five or seven men appointed by some such disinterested authorities as Chief Justice White of the United States Supreme Court, Judge M. A. Knapp, and Commissioner C. P. Neill, as was done in the engineers' case.

The railroads' committee says that in the instructions to the various lodges sent out by the Firemen's Committee, there is this paragraph:

"Under no circumstances should any person voting be told that 'there is no danger of a strike,' for it is expected that every man will vote just as he intends to act. If he does not expect to leave the service of the company, if necessary, he should not deceive the officers of the Brotherhood by voting Yes."

The railroads, says Mr. Lee, stand prepared to grant certain increases; and they agree that the firemen deserve adjustments in their wages; but the amount claimed is neither warranted by conditions, nor within the power of the companies to pay, having due regard to their other obligations. Continuing, he says:

"At a recent conference between the firemen's committee and the railroad managers, President W. S. Carter, of the firemen, used this language: 'I speak the truth when I say that railroad employees are anxious that our little private troubles should not result in injury to both of us. This public that you are talking about sometimes had best not know our troubles. If there is anything in the world we absolutely refuse to do, it is to go through with what the engineers went through, which was practically a fiasco.'"

In a later circular, Mr. Lee says:

"It has been stated in the press that the firemen prepared to arbitrate under the Erdman Act, which the railroads decline to do. The strike ballot is worded so as to demand an increase in the firemen's payroll of \$9,600,000, or 35 per cent. annually. Assuming, however, that the real object of the ballot is to force upon the railroads arbitration under the Erdman Act, the railroad companies wish their position made clear. The railroads are prepared to arbitrate before a commission of five or seven or nine men. . . . This was done in the engineers' controversy. It was fair. It satisfied the people of the country.

"The objection to the Erdman Act is apparent from a statement of what the act plans, namely, that arbitration shall be by a commission of three, one appointed by each side, and the third by the other two, or else by Judge Knapp and Commissioner Neill. The whole decision is in the hands of one man. It is too much power

for one man to have. The Erdman Act was drafted to settle labor disputes on single railroads, not on all the railroads of a large territory.

"P. H. Morrissey, the engineers' representative on the recent Arbitration Commission, recognizes this defect of the Erdman Act. He says: 'The Act might also be amended so that the arbitration board might have three, five, seven or nine members, depending upon the magnitude of the issue, with the neutral representatives holding the balance of power.'

"The neutral members of a wage arbitration affecting railroads represent the public. It is the interests of the public, along with their employees' and their own, that the railroads are endeavoring to protect. They maintain that the engineers' arbitration board was right in saying: 'The most fundamental defect of the Erdman Act is that the interests of the public are not guarded by it.'"

American Wood Preservers' Association.

At the closing session of the convention of the American Wood Preservers' Association, Thursday afternoon of last week, a resolution was adopted petitioning the Ways and Means Committee of Congress to retain creosote upon the free list, calling attention to the injury to the wood preserving industry and to the conservation of forests as a whole if the import duty of 10 per cent. proposed by the Underwood bill be allowed to pass. In addition to petitioning the various members of Congress, a committee was appointed to appear before the Ways and Means Committee at the proper time.

Another resolution was adopted opposing a bill now before Congress for taking the control of the forests from the national government and placing it with the individual states.

The following officers were elected for the ensuing year: President, A. E. Larkin, manager Republic Creosoting Company, Minneapolis, Minn.; first vice-president, J. H. Waterman, superintendent of treating plant, Chicago, Burlington & Quincy, Galesburg, Ill.; second vice-president, E. F. Fulks, American Creosoting Company, Chicago; third vice-president, George E. Rex, manager of treating plants, Atchison, Topeka & Santa Fe, Topeka, Kan.; secretary-treasurer, F. J. Angier, superintendent of timber preservation, Baltimore & Ohio, Baltimore, Md. New Orleans was selected as the location for the next meeting.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Convention, May 6-9, St. Louis, Mo.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Annual meeting, June 17-20, Buffalo, N. Y.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, May 21, New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, October 21-23, 1913, Montreal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Convention, March 18-20, 1913, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 11-13, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago. Next meeting, May, 1913, Baltimore, Md.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June, 1913, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago; annual, May 20, 1913, St. Louis, Mo.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.
- ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y. Annual meeting, October 8, Philadelphia, Pa.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—H. A. Neally, Joseph Dixon Crucible Co., Jersey City, N. J. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, June 18, Bluff Point, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual meeting, May, 1913, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, Chicago & North Western, Escanaba, Mich. Next convention, July 22-25, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Annual meeting, August 18, Richmond, Va.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Convention, May 26-29, 1913, Chicago.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 16-18, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Annual meeting, September 9-12, Ottawa, Can.

NATIONAL RAILWAY AFFILIANCES' ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meeting with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C., M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Tuesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, second week in December, 1913, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo. Next meeting, August 12-15, Nashville, Tenn.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City, Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Meetings, March 17, Chicago; June 10-11, New York, convention, October 14, Nashville, Tenn.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio. Annual convention, May 19-21, Chicago.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. AND TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Convention, September 8-12, 1913, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala. Next meeting, April 17, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meeting with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago. Annual meeting, June 17, Los Angeles, Cal.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, August, 1913, Chicago.

UTAH SOCIETY OF ENGINEERS.—R. B. Ketchum, University of Utah, Salt Lake City, Utah; 3d Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

Wholesale dealers at New York City are said now to have on hand at freight terminals about 1,000,000 barrels of flour, which is one-third more than is usual at this time of the year—or at any time. The flour warehouses at all of the railroad terminals are crowded.

The Southern Railway is to run an agricultural instruction train over its lines in Virginia from February 6 to February 27, making stops at 36 places. The train will be made up of five cars, of which two are to be used for lectures and two for exhibits. The Virginia Department of Agriculture will co-operate with the road.

After a conference with a committee representing various local business associations, and including three aldermen, President Markham, of the Illinois Central, has agreed to restore the round-trip suburban fares in Chicago to the rates charged before January 1, when the rates were advanced to two cents a mile. The old round-trip rates will be restored on February 1, but the one-way single fares will remain at two cents a mile.

A supplement to Western Classification No. 51 has been completed by the Western Classification Committee following the recommendations of the Interstate Commerce Commission for changes in the classification following the commission's investigation. It is intended to put the supplement into effect on short notice on February 14, if it is approved by the commission, simultaneously with No. 51, which will have been suspended for a full year on that date.

The Missouri Pacific is to establish five large demonstration farms and is planning to go into this work for the benefit of the farmers on a large scale. The farms will range in size from 25 to 40 acres. They will be under the supervision of L. A. Markham, agricultural commissioner of the road, whose office is at Little Rock. Mr. Markham was formerly in the service of the agricultural department at Washington, and he will have the co-operation of that department as well as of the state agricultural colleges of Arkansas and Louisiana. Three of the farms will be in Arkansas and two in Louisiana, and probably a sixth will be established in southern Missouri. It has been decided to continue this experimental work at least three years, whether results be favorable or otherwise.

Proposed Reports of Traffic Statistics.

The Interstate Commerce Commission, having conferred with prominent railway officers and secured the co-operation of a committee of the Association of American Railway Accounting Officers, is considering the question of formulating a general scheme of traffic statistics under which reports would be made by the carriers giving information such as might be useful to the commission in considering questions before it, especially questions regarding increases or decreases in freight rates. As a preliminary to this, a circular has been issued signed William J. Meyers, statistician of the commission, calling for information from the railways to be sent in before February 10 as to the practicability of making the proposed report, and asking also for opinions as to the best method of procedure. It is desired to have records of the movement of imported commodities from principal traffic centers to other traffic centers, showing both tonnage and revenue. The tonnage is shown also in carloads. In the circular now sent out Mr. Meyers presents a suggested standard list of commodities; a standard list of districts of production and of consumption and a sample statement form. Under one of the plans proposed all of these traffic statistics would be made up at the station of destination so as to insure accuracy in spite of diversions in transit and other irregularities, such as stopping in transit for manufacture or partial manufacture. The tentative list of commodities contains 98 items. The tentative list of points of origin and destination covers the whole of the United States, and also has a dozen items to represent foreign countries; for example, the districts in Massachusetts are (1) Boston, Cambridge and Lynn; (2) Brockton; (3) Fall River, New Bedford; (4) Holyoke, Springfield; (5) Lawrence, Lowell; (6) Somerville; (7) Worcester; (9) remainder of Massachusetts. Railway officers

receiving this circular are asked to make criticisms or offer alternative plans and to give an estimate of the expense of producing records under the plan proposed.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 135A, giving a summary of car surpluses and shortages by groups from October 11, 1911, to January 15, 1913, says: The total surplus on January 15, 1913, was 53,230 cars; on December 31, 1912, 50,659 cars; on January 17, 1912, 102,479 cars.

Compared with the preceding period; there is an increase in the total surplus of 2,571 cars, made up as follows, 6,701 box, 450 flat, 92 miscellaneous, and a decrease of 4,672 coal car surplus. The increase in box car surplus is in groups 2 (New York, New Jersey, Delaware, Maryland and eastern Pennsyl-

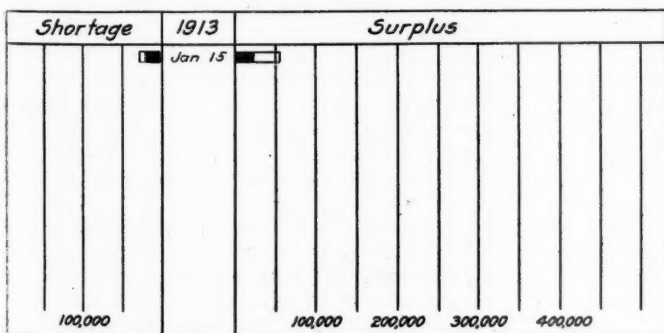
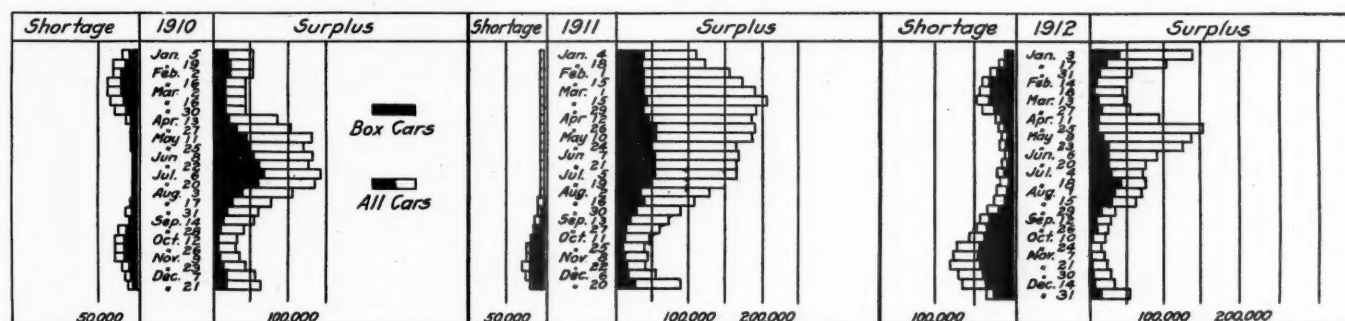
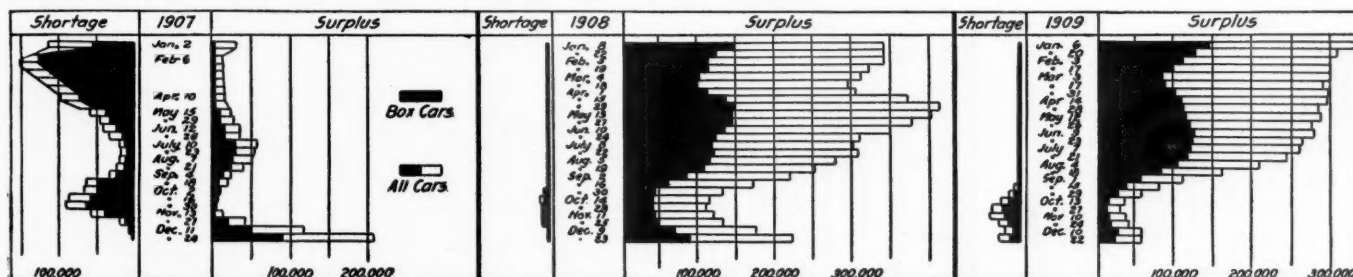
vania), 3 (Ohio, Indiana, Michigan and western Pennsylvania), 4 (the Virginias and Carolinas), 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida), 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas), 9 (Texas, Louisiana and New Mexico), 10 (Washington, Oregon, Idaho, California, Nevada and Arizona), and 11 (Canadian lines). The increase in flat car surplus is in groups 1 (New England lines), 7 (Montana, Wyoming, Nebraska and the Dakotas), 9, 10 and 11 (as above). The decrease in coal car surplus is in groups 2, 3, 5, 7 and 8 (as above). The increase in miscellaneous car surplus is in groups 2, 3, 10 and 11 (as above).

The total shortage on January 15, 1913, was 24,791 cars; on December 31, 1912, 33,601 cars; on January 17, 1912, 12,194 cars. Compared with the preceding period; there is a decrease in the total shortage of 8,810 cars, of which 6,527 is in box, 658 in flat, 1,227 in coal and 398 in miscellaneous cars. The decrease in box car shortage is in all groups, except in 1, 5, 7 and 9 (as above). The decrease in flat car shortage is general except in

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses				Shortages			
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.
Group *1.—January 15, 1913.....	7	50	770	137	35	992	319	44	173
" 2.—" 15, 1913.....	31	1,047	42	1,653	135	2,877	41	0	1,190
" 3.—" 15, 1913.....	29	2,691	317	1,694	1,181	5,883	1,593	10	531
" 4.—" 15, 1913.....	11	4,826	91	768	1,126	6,811	885	474	442
" 5.—" 15, 1913.....	26	411	13	538	615	1,577	3,360	979	653
" 6.—" 15, 1913.....	30	763	471	2,083	2,390	5,707	5,463	468	502
" 7.—" 15, 1913.....	5	38	253	109	380	780	503	0	10
" 8.—" 15, 1913.....	18	1,458	350	2,089	1,713	5,610	751	19	0
" 9.—" 15, 1913.....	15	2,855	239	398	580	4,072	50	4	8
" 10.—" 15, 1913.....	23	4,319	1,368	2,682	7,892	16,261	581	41	0
" 11.—" 15, 1913.....	7	1,321	610	0	722	2,653	4,023	54	0
Total, January 15, 1913.....	202	19,779	4,531	12,151	16,769	53,230	17,569	2,093	3,509
									1,620
									24,791

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages from 1907 to 1913.

groups 6 (Iowa, Illinois, Wisconsin and Minnesota), 10 and 11 (as above). The decrease in coal car shortage is in groups 2, 3, 7 and 10 (as above). The decrease in miscellaneous car shortage is general with the sole exception of group 1 as was mentioned above.

Compared with the same date of 1912; there is a decrease in the total surplus of 49,249 cars, of which 3,332 is in box, 4,747 in flat, 30,619 in coal, and 10,551 in miscellaneous. There is an increase in the total shortage of 12,597 cars, of which 8,699 is in box, 1,908 in flat, 934 in coal and 1,056 in miscellaneous cars.

The accompanying table gives car surplus and shortage figures by groups for the last periods covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1913.

Traffic Club of Chicago.

The sixth annual dinner of the Traffic Club of Chicago was the most successful in its history, there being 650 members and guests present. The speakers were John H. Atwood, of Kansas City; W. D. Nesbit and James Hamilton Lewis, of Chicago. George A. Blair, traffic manager of the Chicago & Alton, was toastmaster.

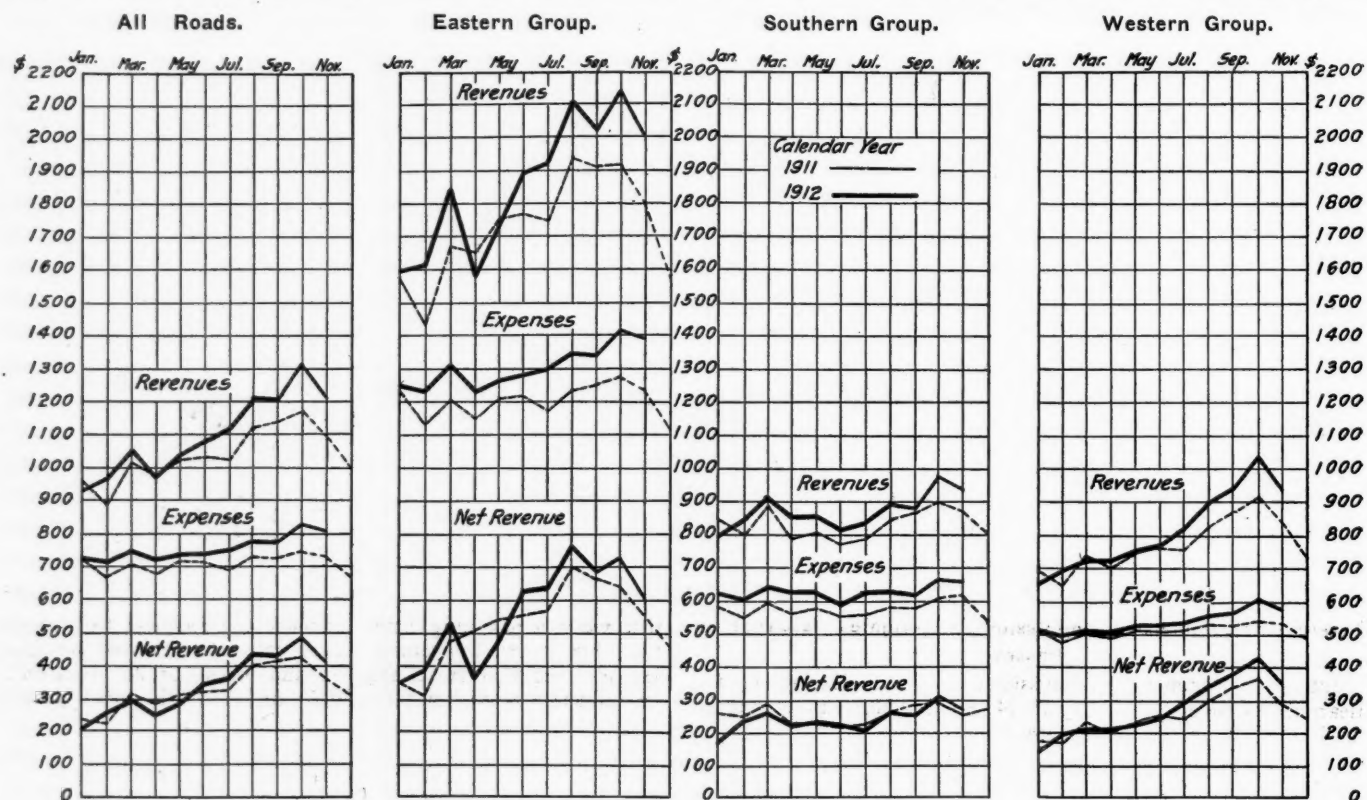
Summary of Revenues and Expenses of Steam Roads in November.

The Bureau of Railway Economics' summary of revenues and expenses and comments thereon for November, 1912, are as follows: The railways whose returns are included in this bulletin operate 221,110 miles of line, or about 90 per cent. of all the steam railway mileage of the United States. The total operating revenues for the month of November, 1912, amounted to \$269,345,082. This includes revenues from freight and passenger traffic, from carrying mail and express, and from miscellaneous sources. Compared with November, 1911, the total operating revenues of these railways show an increase of \$30,984,296. These total operating revenues per mile of line

outside operations less taxes, amounted in November to \$363.75 per mile of line, and in November, 1911, to \$315.06. This was an increase for 1912 of \$48.69, or 15.5 per cent. Operating income for each mile of line for each day in November averaged \$12.13, and for November, 1911, \$10.50. This represents the gross income available to the railways for rentals, interest on bonds, appropriations, and dividends.

The operating ratio for November, that is, the per cent. of total operating revenues which was absorbed in operating expenses, was 66.4 per cent., which is comparable with 63.1 per cent. in October, 1912, and 64.4 per cent. in November, 1911.

The eastern group of railways shows an increase in total operating revenues per mile of line as compared with November, 1911, of 11.7 per cent., the southern group an increase of 7.6 per cent., and the western group an increase of 12.1 per cent. Operating expenses per mile increased 12.6 per cent. on the eastern railways, 7.5 per cent. on the southern railways, and 8.5 per cent. on the western railways. For the eastern group of railways net operating revenue per mile increased 9.6 per cent., for the southern group it increased 7.8 per cent., and for the western group it increased 18.6 per cent. The increase in taxes per mile was 7.8 per cent. in the southern group, and



Monthly Revenues and Expenses Per Mile of Line in 1911 and 1912.

amounted to \$1,218 in November, 1912, and \$1,096 in November, 1911, an increase for 1912 of \$122, or 11.1 per cent. Freight revenue per mile increased 12.8 per cent., and passenger revenue 6.2 per cent.

Operating expenses, which include all the costs of maintaining track and equipment, operating trains, securing traffic, and of administration, amounted in November to \$178,971,350. This was \$18,968,253 more than for November, 1911. These operating expenses per mile of line amounted to \$809 in November, 1912, and \$736 in November, 1911, an increase for 1912 of \$73 per mile, or 10.0 per cent. All the five primary operating expense accounts showed increases over 1911.

Net operating revenue, that is, total operating revenue less operating expenses, amounted in November to \$90,373,732. This was \$12,016,042 more than for November, 1911. Net operating revenue per mile of line amounted to \$409 in November, 1912, and \$360 in November, 1911, an increase for 1912 of \$48 per mile, or 13.4 per cent. Taxes for the month of November amounted to \$10,206,754, or \$46 per mile, an increase of 1.4 per cent. over November, 1911.

Operating income, which is the net revenue from rail and

2.7 per cent. in the western group; in the eastern group there was a decrease of 1.5 per cent. Operating income per mile increased 11.3 per cent. in the eastern group, 8.2 per cent. in the southern group, and 21.3 per cent. in the western group.

Comparison of the returns for the five months of the fiscal year with those of the corresponding months of the previous fiscal year reveals an increase in total operating revenues per mile of 9.4 per cent., an increase in operating expenses per mile of 8.6 per cent., and an increase in net operating revenue per mile of 10.9 per cent. This net operating revenue per mile of the eastern group of railways increased 9.3 per cent., as compared with the corresponding period of the previous year, that of the southern group increased less than one-tenth of one per cent., while that of the western group increased 15.8 per cent.

When the returns for the 11 months of the calendar year 1912 are compared with those of the corresponding months of 1911, they show an increase in total operating revenues per mile of 5.8 per cent., an increase in operating expenses per mile of 6.3 per cent., and an increase in net operating revenue per mile of 4.5 per cent. There was an increase in net operating revenue per mile of 4.8 per cent. in the eastern group, an in-

crease of 7.4 per cent. in the western group, and a decrease of 4.5 per cent. in the southern group.

The diagram shows the variations in total operating revenues, operating expenses and net operating revenue per mile for several months of the calendar year 1911 and of the calendar year 1912 to date. The following table shows the per cent. of operating revenues consumed by each class of expenses:

	PER CENT. OF TOTAL OPERATING REVENUES.					
	November.		Fiscal year ending		Calendar year ending	
	1912.	1911.	1912.	1911.	1911.	1910.
Maint. of way and structures.....	12.8	11.3	12.7	12.9	12.7	13.3
Maint. of equipment.....	15.5	14.9	15.8	15.5	15.5	15.3
Traffic expenses.....	1.8	1.9	2.2	2.2	2.1	2.1
Transportation expenses.....	34.1	34.0	35.9	35.5	35.4	34.7
General expenses.....	2.2	2.3	2.5	2.5	2.6	2.4
Total operating expenses.....	66.4	64.4	69.1	68.6	68.3	67.8

Car Location.

The accompanying table, which is taken from Car Location, bulletin No. 1-A, of the American Railway Association, gives a summary of the location of freight car equipment by groups on December 14, together with surpluses and shortages on the same date.

CAR LOCATION ON DECEMBER 14, 1912.

	New England.	N.Y., N.J., Del., Md., Pa.	Ohio, Ind., Mich., Pa.	Ohio, Ind., Va., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kans., Colo., Okla., Mo., Ark.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned.....	86,838	667,152	297,514	199,695	161,386	457,853	16,633	154,549	29,906	109,112	124,114	2,304,752
Home Cars on Home Roads.....	39,469	320,905	82,144	88,947	63,718	276,387	3,632	63,370	11,790	57,944	81,794	1,090,100
Home Cars on Foreign Roads.....	47,369	346,247	215,370	110,748	97,668	181,466	13,001	91,179	18,116	51,168	42,320	1,214,652
Foreign Cars on Home Roads.....	66,159	315,851	196,097	86,219	82,465	200,544	12,227	86,467	34,779	56,466	64,907	1,202,181
Total Cars on Line.....	105,628	636,756	278,241	175,166	146,183	476,931	15,859	149,837	46,569	114,410	146,701	2,292,281
Excess or Deficiency.....	18,790	*30,396	*19,273	*24,529	*15,203	19,078	*774	4,712	16,663	5,298	22,587	*12,471
Surplus.....	729	1,999	325	1,398	82	5,284	590	2,330	1,459	11,587	831	26,614
Shortage.....	1,542	6,410	11,178	10,447	7,592	9,108	623	2,675	581	3,334	7,516	61,006
Shop Cars—												
Home Cars in Home Shops.....	4,895	25,496	11,665	8,995	7,613	21,974	301	7,210	1,152	3,080	1,805	94,186
Foreign Cars in Home Shops.....	1,689	7,051	6,074	2,081	1,801	6,368	604	2,302	1,262	1,923	179	31,334
Total Cars in Shops.....	6,584	32,547	17,739	11,076	9,414	28,342	905	9,512	2,414	5,003	1,984	125,520
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads.....	45.45	48.10	27.61	44.54	39.48	60.37	21.84	41.00	39.42	53.11	65.90	47.28
Total Cars on Line.....	119.20	95.44	93.43	87.72	89.66	104.16	95.35	95.88	155.72	104.86	118.20	99.22
Home Cars in Home Shops.....	5.64	3.82	4.25	4.51	4.72	4.83	1.81	4.67	3.85	2.83	3.19	4.26
Foreign Cars in Home Shops.....	1.42	1.06	2.22	1.04	1.12	1.40	3.63	1.40	4.22	1.76	.31	1.42
Total Cars in Shops.....	7.06	4.88	6.47	5.55	5.84	6.23	5.44	6.07	8.07	4.59	3.50	5.68

* Denotes deficiency.

Interstate Commerce Commission Investigates Issuance of Passes.

Interstate Commerce Commissioner James S. Harlan, held a hearing at Denver on January 23, 24 and 25, which was announced as the first of a series in a general investigation of the practices of the railways in the issuance of free transportation. The commission states that its inquiry has already shown that "carriers have very generally obeyed the letter of the law," but that information has reached the commission that "the issuance of passes for state travel has operated to defeat the purpose of the act to regulate commerce; that passes for state travel have been issued to certain shippers and denied to others; and that the moving consideration of such passes has been the routing of interstate shipments of property." Commissioner Harlan announced that no evidence taken in the hearing would be used in any way against those testifying and that the inquiry was for the purpose of determining what new regulations are necessary to prevent discrimination, and what further steps must be taken by the commission to enforce the law in regard to the giving of passes. Several of the Colorado roads were indicted last fall at Pueblo, Colo., for alleged discrimination in issuing intra-state passes to interstate shippers, following which the roads generally ceased the practice on December 1. Colorado has no state anti-pass law.

A large number of Denver railway officials testified regarding the issuance of state passes by their companies, and all expressed the opinion that the roads would greatly prefer to cease issuing passes altogether. They said that state passes had been given not for the direct purpose of influencing interstate traffic, but to cultivate friendship among shippers or men of influence, or to promote enterprises for the benefit of the community, and that

competition had extended the practice to unreasonable limits. A large number of shippers who had been given passes were called as witnesses after lists of the recipients had been put in the record, and most of them testified that the issuance of free transportation had not influenced the routing of their business, but that they had accepted or solicited passes because it was the custom. Many expressed gratification that the practice had been discontinued.

J. B. Andrews, assistant to the vice-president of the Denver & Rio Grande, said that the roads welcomed the opportunity given by the indictments to cut off the passes on December 1; that state passes had been given to friends of railway officials, to mining men, stock men, politicians and business men, but that the company had not violated the federal pass law. He quoted from records of the company showing that in the month of June, 1912, free transportation had been issued to the amount of \$65,000, or approximately 16 per cent. of the passenger revenue of the road. While most of the passes had been given to politicians and office holders, many were given to ministers and other persons of influence, to people traveling on business relating to the development of the state in various ways, and for charitable purposes.

Fred Wild, Jr., general freight agent of the Denver & Rio Grande, said the giving of passes had become a custom, and

that while a pass might not influence the recipient to give the road his traffic, its refusal might cause the loss of business. He admitted that small shippers and people of no prominence or influence were refused passes, and that the practice was discriminatory.

G. W. Martin, general agent of the Rock Island, said his road issued 52 passes in September in Colorado, which was probably a fair average. When his attention was called to the fact that 31 of the 52 had been issued to a town near the Kansas-Colorado state line, he said he had no knowledge as to whether they were used to cover part of an interstate journey, but that passes issued to that point enabled the users to cover as much ground as possible in trips through the state.

F. A. Wadleigh, general passenger agent of the Denver & Rio Grande, said a large proportion of the passes given through his office were issued to such men as agricultural professors and officers of various organizations engaged in development work.

John F. Vallery, general agent of the Chicago, Burlington & Quincy, said his road had discontinued the issuance of passes in Colorado five years ago, and that its freight business had suffered perceptibly.

Other railway men who testified admitted that passes were given to interstate shippers, but explained the practice with reasons other than the fact that the recipients were interstate shippers. A soliciting agent asserted, however, that he had found that some of his competitors had frequently left passes on the desks of shippers in their absence, and he had asked for passes to distribute to meet the competition.

The names of a large number of persons to whom passes had been issued by the roads were read into the record, and many of them were later called for examination. One man said he

had paid fare for many years, until he thought his tickets appeared lonesome among so many passes on the train, and that the conductor seemed to regard him as a "boob" for paying fare, so he asked for and obtained passes.

Weighing Hearing at Chicago.

Commissioner Prouty, of the Interstate Commerce Commission, held a hearing at Chicago on January 24 and 25, as part of the investigation which has been conducted by the commission during the past year into the practices of the railways in the weighing of carload freight.

A. S. Dodge, superintendent of the Western Railway Weighing Association & Inspection Bureau, submitted a series of exhibits showing the work of the bureau during the past year. In 1912, 2,402,749 cars were weighed, both loaded and empty, on bureau scales, in addition to 4,209,368 weighed using the stenciled tare, making a total of 6,612,117. Of 172,463 cars check-weighed during the year, 125,203 were loaded with lumber and 47,260 with merchandise, and only on 19,295 cars, or 11.2 per cent, was it necessary to correct the waybills on account of a variation of 1,000 lbs. or over, between the check-weight and the first scale weight. The total number of cars checked under weight agreements was 1,751,051, of which only 4,155 were check-weighed. Of these only 415, or 10 per cent, showed a variation of over 1,000 lbs. These consisted largely of grain cars subject to Board of Trade weights. Of the empty cars weighed by bureau weighmasters from January 1 to October 31, 1912, inclusive, 10,501 cars, or 59.4 per cent, showed the stenciled tare greater than the actual tare by 10,191,747 lbs., or an average of 971 lbs. per car, while on 7,171 cars, or 40.6 per cent, the stenciled tare was less than the actual tare by 6,950,445 lbs., an average of 969 lbs. per car. Thus in nearly 60 per cent of the cases the variation between the stenciled tare and the actual tare operated in favor of the shippers. These figures compare with a similar statement submitted by Mr. Dodge in March, 1912, showing that on 59 per cent of the cars weighed in 1911 the stenciled weight was greater than the actual, or to the advantage of the shipper. Mr. Dodge also submitted a statement showing that 126,200 corrections in weight had been made by bureau inspectors during the calendar year 1912, which resulted in an increase of earnings to the carriers amounting to \$236,448.01 and that \$27,746.98 was collected during the year 1912 in payment of undercharges from shippers who have executed weight agreements with the bureau.

Mr. Dodge also submitted a statement of claims handled during the year, showing the percentage recommended paid, declined or otherwise disposed of by the bureau as follows:

MISCELLANEOUS CLAIMS.		
Total number handled, 23,682.		
Recommended lower scale weight.....	792	5 per cent.
Recommended estimated weight.....	140	1 per cent.
Recommended special agreement weight..	1,389	8 per cent.
Recommended for various reasons.....	8,923	53 per cent.
Recommended payment	11,244	67 per cent.
Recommended declined	5,633	33 per cent.
	16,877	100 per cent.
LUMBER CLAIMS.		
Total number handled, 14,184.		
Recommended estimated weight.....	792	8 per cent.
Recommended lower scale weight.....	1,323	14 per cent.
Recommended account no scale weight..	534	6 per cent.
Recommended for various reasons.....	1,231	13 per cent.
Recommended payment	3,880	41 per cent.
Recommended declined	5,609	59 per cent.
	9,489	100 per cent.
GRAND TOTAL.		
Recommended payment	15,124	57 per cent.
Recommended declined	11,242	43 per cent.
	26,366	100 per cent.

In reply to questions by Commissioner Prouty, Mr. Dodge also testified that from one and one-half to two minutes is required to weigh a car with one end coupled, and that the time would be nearly doubled if both ends were uncoupled; whereas, three cars may be weighed per minute in motion. He was strongly in favor of a reweighing of cars for less than 1,000 lbs. variation, and was inclined to the opinion that an allowance of one per cent. would be more nearly correct. Commissioner Prouty expressed his opinion that no such allowance as even 500 lbs. should be tolerated in the case of commodities that do not shrink in transit.

Mr. Dodge also pointed out that a check of the figures sub-

mitted by Chairman Staples of the Minnesota commission at the hearing last March, showing wide variations between the stenciled and actual weights, had shown that the Minnesota commission had not taken into consideration a large number of temporary grain doors and boards found in the cars at the time they were weighed empty, which were of course not included in the stenciled weights.

Charles Ware, general manager of the Union Pacific, testified as to changes in the weighing practices of his road, which have been made to correct defects which were brought out at the hearing in Salt Lake City last year. Since that time the company has adopted as standard a 150-ton 50-ft. track scale with concrete foundations, in place of the previous standard of 100-ton 40-ft. scales. The Union Pacific has track scales at 41 points.

A scale test car has recently been constructed to travel over the line for the purpose of checking the scales, and arrangements are now being made for the installation of the necessary machinery at a central plant to which the company's scales may be shipped for repairs, thereby eliminating delays incident to returning them to the manufacturers. Mr. Ware said that it is the desire of the Union Pacific to have the best possible scales, as correct weights are as important to the railroad as to the shipper, if not more important. Arrangements are now being made to install nine new scales, and a statement submitted by Mr. Ware showed that all of the various defects reported at the Salt Lake City hearing have been corrected since that time. Only 12 out of the 41 track scales now have timber foundations, and arrangements have been made to replace these with concrete.

A. F. Epright, supervisor of scales of the Pennsylvania Railroad, was questioned at some length regarding weighing practices of the Pennsylvania, particularly with reference to the handling of coal shipments, and F. E. Church, manager of the scale department of Fairbanks, Morse & Co., added to his testimony of last March regarding the mechanical features of scale construction. Mr. Church said that in his opinion accurate weights could not be obtained where cars are weighed in motion, which precipitated a lively discussion as to the necessity for and the accuracy of motion weighing. Commissioner Prouty said there could be no doubt that motion weighing was less accurate than weighing cars cut from the train, but that there might be doubt as to the practicability of prohibiting motion weighing. In the discussion Commissioner Prouty charged H. W. Woolf, manager of the Southern Weighing & Inspection Bureau, with having attempted to influence Mr. Church's testimony by sending telegrams to the executive officers of several roads, members of the bureau, asking them to suggest to the company that some of his statements be modified at the next hearing. Commissioner Prouty expressed the opinion that this represented an implied threat of loss of business to Fairbanks, Morse & Co. Mr. Woolf denied any such intention, saying that his own experience of ten years had demonstrated that motion weighing, if properly performed, was sufficiently accurate, and that he wished to have some of the practical men employed by Fairbanks, Morse & Co. confer on the subject with Mr. Church, who had testified that he was a scale expert, but had had no experience in the actual weighing of cars.

The hearing is to be resumed at Chicago on February 26.

INTERSTATE COMMERCE COMMISSION.

The commission has suspended from February 1 until May 31, the items in certain tariffs, which advance from 30,000 lbs. to 33,000 lbs., the minimum carload weight on potatoes, effective during the period October 1 to May 31 of each year, from points in Wisconsin, Minnesota, Michigan and other states to points in Western Trunk Line and Central Freight Association territories.

The commission has decided to make a general inquiry into the issuance of free passes, and the first public hearing on the subject was held in Denver, Col., last week by Commissioner Harlan. It was in the state of Colorado that two railroad companies were indicted recently by a federal grand jury on the charge of issuing passes, for travel within the state, for the purpose of influencing shipments of freight in intrastate traffic.

The commission has suspended from January 1 until May 1, an item in a supplement to Griffin's tariff. Heretofore, this tariff has provided that refrigeration charges on perishable

fruits between Utah and Colorado common points will be performed by the carriers at a charge of 12½ cents per 100 lbs. for the amount of ice furnished. The suspended item provides a flat charge of \$40 per car. It is asserted by shippers that, under the present provisions, the icing charge upon this traffic does not amount to more than \$24 per car on the average, as against the proposed flat charge of \$40 per car.

Reparation Awarded.

Alfred Struck Company v. Louisville & Nashville et al. Opinion by the commission:

The commission found that interior house trimmings "in the white" as carried in southern classification did not include trimmings which have been treated before shipment to a coat of priming or filler and a coat of shellac. Classification of interior house trimmings as applicable in southern classification was not shown to be unreasonable. (25 I. C. C., 656.)

Complaint Dismissed.

Philadelphia Veneer & Lumber Company, Incorporated, v. Central Railroad Company of New Jersey et al.

The commission found that rates of 31 cents per 100 lbs., all-rail, and 29 cents per 100 lbs., rail-and-water, for the transportation of imported Spanish cedar logs from New York, N. Y., to Knoxville, Tenn., were not unreasonable or unduly discriminatory. (25 I. C. C., 653.)

Preston L. Hill v. Pennsylvania Railroad et al. Opinion by the commission:

The defendant's tariff did not provide for adjustment of charges on a "punch-cancellation" commutation ticket lost by the owner, but the ticket was subject to conditions which would not entitle the owner to receive redemption money on account of loss. The commission found that the failure of defendants to provide in its tariff for the payment of redemption money on account of lost and unrecovered commutation ticket of the "punch-cancellation" variety was not unreasonable. (25 I. C. C., 650.)

Minimum Weight Reduced.

Irvin Kibbe v. St. Louis, Brownsville & Mexico et al. Opinion by the commission:

The commission found that the minimum carload weight of 22,000 lbs. on calves from Refugio, Tex., to New Orleans, La., and St. Louis, Mo., was unreasonable, and prescribed a minimum of 17,000 lbs. for the future. (25 I. C. C., 661.)

Reparation on Mohair Shipments.

National Mohair Growers' Association v. Atchison, Topeka & Santa Fe et al. Opinion by Chairman Prouty:

Following the *Wool case*, 25 I. C. C., 675, abstracted below, reparation on shipments of mohair will be awarded from March 21, 1912. (25 I. C. C., 679.)

Scrap Iron Rates Reduced.

Bartlesville Salvage Company et al. v. Missouri, Kansas & Texas et al. Opinion by the commission:

The commission found that the rate of 20 cents per 100 lbs., minimum weight 30,000 lbs., for the transportation of scrap iron from Bartlesville, Okla., to St. Louis, Mo., was unreasonable to the extent that it exceeds 17 cents per 100 lbs., minimum weight 40,000 lbs., and prescribed that rate for the future. (25 I. C. C., 672.)

Rates on Trunk Covering Materials Increased.

In re investigation and suspension of advances in rates by carriers for the transportation of tin plate and sheet metal from eastern shipping points to points in Oregon, Washington, and other destinations.

The attempt of certain shippers to move sheet metal of commerce under the description and rates applicable to trunk-covering materials directed the attention of the carriers to an obscurity in their tariffs and to the fact that lower rates were applicable to trunk-covering materials, although they are more valuable than the sheet metal of commerce. Tariffs filed to correct the improper relation of rates on the two commodities were suspended, but the commission found that the proposed

increases are reasonable and the order of suspension was vacated. (25 I. C. C., 685.)

Empty Package Rates.

Portner Brewing Company v. Southern Railway. Opinion by the commission:

The assembling of empty packages at one point by the shipper, when the filled packages were shipped to several points, in order to obtain sufficient for return carload shipments, is contrary to a rule of the southern classification. Returned empty-package rate applied only from and to the points between which the original shipment moved. (25 I. C. C., 659.)

Excessive Rates Charged Due to Error.

Seaboard Refining Company, Ltd., v. Alabama Great Southern et al. Opinion by the commission:

The complainant contends that through the enforcement by the Texas & Pacific of certain regulations for the use of track receipts or switching tickets in handling refined oil from Gretna to New Orleans for delivery to connections, it was deprived of the benefit of the through rate from points of origin in Texas and Louisiana to Chicago and Cleveland on cottonseed oil refined in transit at Gretna. Reparation is asked. The commission found that the effect of the action taken by the Texas & Pacific was to make the movement from Gretna to Chicago an entirely new movement, and also that the road did not always enforce these regulations. The commission, therefore, decided that the action of the Texas & Pacific was in error and that the through rate should have been charged. Reparation was awarded. (25 I. C. C., 702.)

Carload Rating on Tobacco Established.

John J. Bagley & Co. v. Pere Marquette et al. Opinion by the commission:

As there was no carload rating established for the transportation of long-cut, fine-cut, cut plug, and granulated smoking tobaccos in carloads from Detroit, Mich., to New York, the commission established a rating of third class with a minimum of 24,000 lbs., subject to rule 27 of official classification. (25 I. C. C., 698.)

Potato Rates Adjusted.

Chamber of Commerce of the City of Beaumont, Tex., v. Texas & New Orleans et al. Opinion by the commission:

The commission found that the rates for the transportation of potatoes and vegetables in carloads from St. Louis, Mo., to Beaumont, Tex., were unduly prejudicial as compared with rates on same commodities from St. Louis to Lake Charles, La., insofar as they exceed the differential resulting from the New Orleans combinations. The carriers were found to have justified the charging of lower rates for the transportation of potatoes, beans and vegetables in carloads from St. Louis, Mo., to Lake Charles, La., than from St. Louis, Mo., to Beaumont, Tex., and accorded limited relief from the operation of the fourth section of the act. (25 I. C. C., 695.)

Reparation on Wool Shipments.

In re investigation of alleged unreasonable rates and practices involved in the transportation of wool, hides and pelts from various western points of origin to eastern destinations.

Railroad Commission of Oregon v. Oregon Railroad & Navigation Company et al.

National Wool Growers' Association v. Oregon Short Line Railroad Company et al. Opinion by Chairman Prouty:

It is by no means true that because a rate is found unreasonable upon a given date it has been unreasonable during the two years preceding, and it can not be assumed that whenever the commission holds a given rate to be unreasonable it will, as a matter of course, award reparation upon the basis of the rate found to be reasonable as to all payments within the two-year limitation.

The commission is not satisfied that the complainant has shown that the rates as stated in the tariffs of the carriers were unreasonable up to the date of the original decision herein, March 21, 1912, mentioned in the *Railway Age Gazette* of April 19, 1912, but from that date the rates and regulations suggested by the commission are held to be reasonable, and

the rates and regulations of the carriers have been unreasonable and unlawful to the extent that they have varied from these.

Reparation from March 21, 1912, will be awarded upon the basis of the rate found reasonable by the commission. (25 I. C. C., 675.)

Advances Permitted.

Rates on knitting-factory products. Opinion by Commissioner Lane:

The tariff schedules under suspension advance the joint rates on knitting-factory products in any quantity from Chicago and near-by points to Little Rock, Fort Smith, and certain other Arkansas points and cancel the proportional rates on these products from Memphis to the same destinations applying on traffic from southeastern points, leaving in effect from many southeastern points the through first-class rates constructed on a differential basis over St. Louis and leaving in effect from other southeastern points combination rates of which the factors west of the river are the first-class rates from Memphis. The commission found that the proposed advances are justified. The order of suspension was vacated. (25 I. C. C., 634.)

Rates on Potash Not Unreasonable.

Arkansas Fertilizer Company v. St. Louis, Iron Mountain & Southern et al. Opinion by Commissioner Clements:

The complainant alleges that the rates charged by the defendants for the transportation of nitrate of soda and potash salts from New Orleans to Little Rock are unreasonable, unjustly discriminatory, and subject it and the latter place to undue prejudice and disadvantage as compared with the rates on the same commodities from New Orleans to Memphis. The record discloses that the rates under investigation apply from other gulf ports as well as from New Orleans and via many routes; and that the rates to Memphis are lower than they otherwise would be by reason of actual and potential water competition, and by reason of the location of Memphis as a Mississippi river gateway. The commission found that the evidence was not conclusive and the complaint was dismissed. (25 I. C. C., 645.)

New Theories on Rate Making.

In re investigation and suspension of advances in rates by carriers for the transportation of coal and coke in carloads from points on the Louisville & Nashville to points on the Cleveland, Cincinnati, Chicago & St. Louis and other destinations. Opinion by Commissioner McChord:

The commission found that the defendant did not sustain the burden of showing the reasonableness of the proposed increased rate from the Appalachian and the St. Charles districts in Virginia on coal to the Ohio river and to points north and south thereof, and on coke to points north of the Ohio river. The defendant was therefore ordered to withdraw the tariff naming the proposed rates and to maintain the present rates. The commission found that the motive actuating a carrier in prescribing an advanced freight rate has no bearing upon the reasonableness of the increased rate. Nor can the reasonableness of rates be proved by categorical answers, *I. C. C. v. U. P. R. R.*, 222 U. S. 541, 549. Where two routes are available it is unfair to consider only the cost via the more expensive route, and when such higher cost is due to improvements and betterments under way, the expenditures which were undoubtedly made to reduce the cost of operating, such cost figures are not representative. Traffic moving during a certain year should not be made to bear the entire cost of permanent improvements and betterments. The commission went into minute details regarding the cost of hauling coal, but its conclusions differed radically from those of the defendant. The commission found that anything above the out-of-pocket cost of handling traffic is a contribution to general expenses and to that extent relieves rather than burdens other traffic. In other words, the commission holds that in fixing a specific rate, only the cost of fuel, wages of crews and repairs to locomotives and cars should be taken into consideration. This means about 50 per cent. of the cost as figured by the defendant, the remaining 50 per cent. being made up chiefly of salaries of general officers and the way and structure account. While cost is an important element in determining the reasonable-

ness of freight rates, it is not controlling, and a reasonable maximum rate is not only such a rate as pays a contributive share of all operating expenses. The carrier should make such improvements to its line as are necessary to reduce the cost of transportation, and if it does not do this, it can hardly claim that it may raise the rate because the cost of transportation is excessive. If a division as a whole is profitable, the fact that a certain portion or portions of it are not profitable does not justify increased rates. The expense which is incurred in originating traffic is a necessary incident to transportation and a condition precedent to the profitable operation of the line as a whole. The fact that one carrier does not receive proper remuneration for its share of the transportation over a joint route does not necessarily prove that the joint rate is unreasonable, but rather that the division of the joint rate is unreasonable. According to the defendant's figures, the cost to it for the transportation of coal exceeds its revenue, while according to the commission's figures the cost is only from 71 to 82 per cent. of the revenue. The commission also found that the present rate had been in effect nearly ten years and that the advance contemplated would probably exclude the Virginia operators from the northern territory. (26 I. C. C., 20.)

STATE COMMISSIONS.

The California railway commission has rendered a decision denying the application of the Southern Pacific to increase passenger fares on its ferry system between San Francisco and Oakland from 5 to 10 cents.

COURT NEWS.

The Supreme Court of the United States in a suit for damages against the American Railroad Company of Porto Rico, because of the death of an engineer, holds that the federal safety appliance act applies in Porto Rico.

In the federal court at Pittsburgh, Pa., this week, fines aggregating \$12,950 were imposed for failure to unload cattle for feeding and watering within the twenty-eight hour limit, the roads fined being the Pennsylvania, the Pittsburgh, Cincinnati, Chicago & St. Louis, and the Baltimore & Ohio.

The government has withdrawn the suit which was entered in the United States District Court at Philadelphia some time ago asking that the Lehigh Valley Railroad Company be made to separate itself from the interests connected with it which mine and sell coal. The court dismissed the bill without prejudice.

Judge Baldwin, of the county circuit court at Chicago, has rendered a decision making permanent an injunction restraining the city of Chicago from enforcing an ordinance requiring the elevated railways to exchange transfers. The court held that the city had no jurisdiction over the fares of the elevated roads, because they were organized under the state railroad laws. The city is planning to appeal the case to the state supreme court.

Judge Callaghan, in the Municipal Court, New York City, in a suit against the Delaware, Lackawanna & Western has decided in favor of the plaintiff on a claim for \$104 damages on a shipment of eggs contained in 297 boxes, a number of which were found to contain broken and cracked eggs. It appears that railroads usually are willing to pay for eggs broken in transit, in cases like this, but that the suit was brought because of the expense to which the consignee was put in repacking boxes which were probably damaged, but not certainly so. The cost of repacking a case of eggs is 10 cents, and it is said that in one terminal in Jersey City, in the last spring season, 86,000 cases of eggs had to be repacked. From this instance—a cost of \$8,600—it is estimated that \$100,000 is spent annually at the railroad terminals at New York City for repacking eggs. In the shipment on which was based the case which has just been decided, it was found that seventeen of the first twenty cases examined showed broken and leaking eggs. This proportion was so large that the consignee decided that he could not sell his eggs at a reasonable price unless he repacked every case in the lot; and the cost of examining cases which were not known beforehand to contain damaged eggs was what the railroad company refused to pay for. It is expected that the road will appeal this case to the Supreme Court of the state.

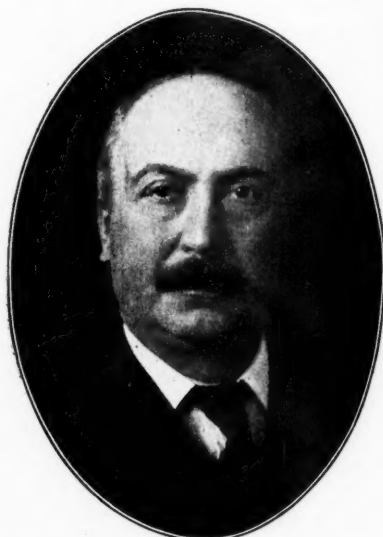
Railway Officers.

Executive, Financial and Legal Officers.

E. J. Chamberlin, president of the Grand Trunk and the Grand Trunk Pacific, with headquarters at Montreal, Que., has been elected president also of the Central Vermont, succeeding E. H. Fitzhugh, resigned.

E. D. Sewall, assistant to the president of the Chicago, Milwaukee & St. Paul, has been elected vice-president, and D. L. Bush, general manager, has been elected vice-president, both with headquarters at Chicago. H. B. Earling, assistant general manager, has been elected vice-president, with office at Seattle, Wash., succeeding H. R. Williams, who has been made vice-president, with headquarters at New York. A photograph and sketch of H. B. Earling were published in the issue of February 16, 1912, page 317. C. B. Ferry, assistant secretary at New York, has been appointed also assistant to vice-president, with office at New York.

David L. Bush, who has been elected vice-president of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was born on July 31, 1855, at Sharon, Wis. He began railway



D. L. Bush.

work in December, 1872, as night operator for the Western Union Railway, and was later to January, 1877, chief operator in the train despatcher's office of that road at Racine, Wis. He was subsequently until September, 1880, train despatcher; from May 1, 1877, to January 1, 1882, also superintendent of that road and the Sabula, Ackley & Dakota, and from September, 1880, to July 1, 1887, also superintendent of the Racine & Southwestern division of the Chicago, Milwaukee & St. Paul. On the latter date he was transferred to the superintendency of the James River division, and from February 1, 1888, to February 1, 1890, was superintendent of the Southern Minnesota division. He then became superintendent of the Hastings & Dakota division, where he remained until August 15, 1894, when he was transferred to the River division as superintendent, with headquarters at St. Paul, Minn. Mr. Bush was promoted to assistant general superintendent, with office at Milwaukee, Wis., on April 1, 1898, and was made general superintendent May 1, 1903. He was appointed general manager, with headquarters at Chicago, October 1, 1909, and his election to the office of vice-president, as noted above, became effective on January 23.

Percy R. Todd, who has been elected president of the Bangor & Aroostook, with headquarters at Bangor, Me., as has been announced in these columns, was born in 1859 at Toronto, Ont., and was educated in the Collegiate Institute, Ottawa. He began railway work as a telegraph operator with the St. Lawrence & Ottawa, now a part of the Canadian Pacific, remaining in that position until 1875, when he became Canadian agent of the Ogdensburg & Lake Champlain, now a part of the Rutland, and four years later was made general traveling agent of the National Dispatch Line at Chicago. From July to December, 1885, he was commercial agent of the New York, West Shore & Buffalo, now a part of the West Shore, at Albany, N. Y., and then for one year was chief clerk to the general freight agent of the same road at New York. He was then for three years general freight and passenger agent of the Canada Atlantic, now a part of the Grand Trunk, at Ottawa, Ont., and the following three years was general freight agent of the West Shore at New York, and from 1892 to 1901, was traffic man-

ager of the same road at New York. He was elected second vice-president of the New York, New Haven & Hartford in 1901, with headquarters at New Haven, and in 1903 was made first vice-president of the same road. In 1907 he was elected vice-president of the Bangor & Aroostook, with headquarters at Bangor, Me., which position he held at the time of his recent election as president of the same road, as above noted.

Edmund D. Sewall, assistant to the president of the Chicago, Milwaukee & St. Paul, at Chicago, has been elected vice-president, with headquarters at Chicago. He was born on April 12, 1855, at Wilmington, Del., and was educated at Taylor and Jackson's Academy in his native town. He began railway work in 1871 as a rodman, with the engineering corps of the Wicomico & Pocomoke, now a part of the Baltimore, Chesapeake & Atlantic, and was then consecutively from March, 1872, to July, 1881, with the engineering department of the Northern Pacific, the Chicago & Canada Southern, the St. Paul, Minneapolis & Manitoba, now a part of the Great Northern, and the St. Paul & Duluth, now a part of the Northern Pacific, and was a clerk in the general freight department of the St. Paul & Pacific, now a part of the Great Northern, also clerk in the local freight office of the same road at St. Paul, Minn. From July, 1881, to September of the following year he was assistant engineer and general superintendent's clerk on the St. Paul & Duluth, and then to January, 1883, was joint agent of the St. Paul & Duluth and the Chicago, Milwaukee & St. Paul at Stillwater, Minn. He was agent of the Chicago, Milwaukee & St. Paul from January, 1883, to May, 1888, when he was made traveling lumber agent, and in December of the following year became commercial agent of the same road at St. Paul, Minn. From March, 1895 to March, 1898, he was assistant general freight agent of the Superior division at Milwaukee, Wis., and then to May 15, 1902, was general northwestern agent of the same road at Minneapolis, Minn. He was assistant general superintendent from May, 1902, to June 1, 1906, at Minneapolis and then was appointed assistant to the president of the same road, with office at Chicago, remaining in that position until his election on January 23, 1913, as vice-president of the same road. He was also vice-president of the Chicago, Milwaukee & Puget Sound from January 1, 1909, to January 1, 1913.

A. R. Whaley, general superintendent of the Electric division of the New York Central & Hudson River, and manager of the Grand Central Terminal, with headquarters at New



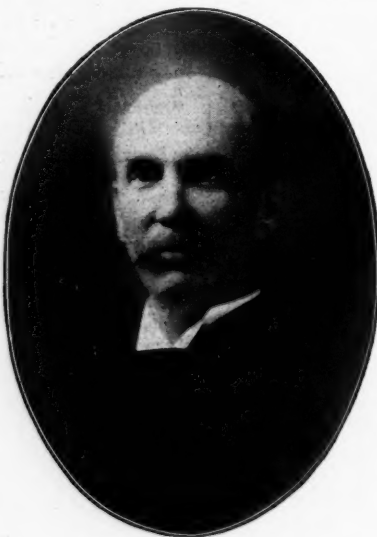
A. R. Whaley.

York, has been elected vice-president in charge of operation of the New York, New Haven & Hartford, with headquarters at New York, succeeding H. J. Horn, whose duties in future will be confined to the Boston & Maine, effective February 1. Mr. Whaley has been in railway service for the past thirty-five years, having begun as a brakeman on the Providence & Worcester, now a part of the New York, New Haven & Hartford, when he was sixteen years old. During the next fourteen years he was successively conductor, station master, assistant trainmaster and general yardmaster; and from this last position he was promoted to be general agent of terminals at Providence. In 1904 he was appointed superintendent of the New York division of the New Haven road, and two years later was chosen by the two roads, the New York Central & Hudson River and New York, New Haven & Hartford, as manager of the joint operation of the New York terminal. The enormous task of tearing down the old and building the new terminal, and the installation of elec-

tric traction was then just being begun; and as general manager during the past 8 years Mr. Whaley has had the immediate responsibility of carrying on the business under the most trying conditions. Over 700 trains were moved in and out of the station every day with an average delay of less than a minute each. The following is from the *Wall Street Journal*:

Mr. Whaley was formerly superintendent of the New York division of the New Haven, and his return to the New Haven, which is gradually expanding its electrical zone eastward, is very natural. He will make his headquarters at the Grand Central Terminal, and in Boston. He started his railroad career when 16 years of age as a freight brakeman on the old Providence & Worcester at \$1.62 a day. That was the time when brakeman on local freights worked twelve to eighteen hours a day. There were no train brakes at that time except in the muscles of the brakemen, who were happy and contented at their work. The career of Whaley from a freight brakeman to a position valued at \$20,000 to \$25,000 a year spans the most epoch making generation of thirty-four years in this country. As superintendent at Providence, he came to have charge of the first heavy traction electrical installation in this country which was on the line between Providence and Fall River. All the electric and terminal change-over at New York has been under him and he has had charge not only of operation but of the power houses, roadbed and equipment, and has been chairman of the committee of seven on auxiliary facilities which has passed upon the work of more than a dozen sub-committees in more than 100 meetings, everyone of which Whaley has presided over. He is the individual landlord or rent collector of the terminal. This terminal will be finished and fully thrown open to the public probably within forty-eight hours of the day Mr. Whaley graduates therefrom to go to the New Haven. Whaley believes in "system, organization and discipline, fair and firm." He says, "If you are fair you can be firm."

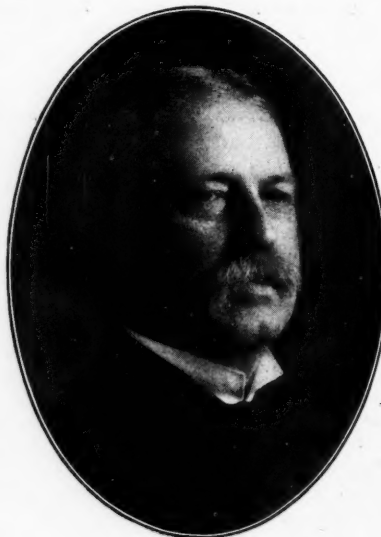
H. R. Williams, who was recently elected vice-president of the Chicago, Milwaukee & St. Paul, with headquarters at Seattle, Wash., as has been announced in these columns, has been transferred to New York as vice-president in charge of the financial and transfer departments. He was born on July 14, 1849, at Palmyra, Wis., and began railway work in January, 1867, with the Chicago, Milwaukee & St. Paul. He was telegraph operator for four years at various stations, then for two years was assistant train despatcher at Milwaukee, and later for eight years was train despatcher on the Hastings & Dakota and River divisions at Minneapolis. He was then for one year trainmaster on the Hastings & Dakota and the Iowa & Minnesota divisions. From January, 1882, to September, 1885, he was superintendent of the Iowa & Minnesota division, and then was superintendent of the Southern Minnesota division at La Crosse, Wis. In February, 1888, he was appointed superintendent of the Ottumwa & Kansas City Line at Kansas City, Mo., and Chillicothe, and from June, 1890, to March, 1898, was assistant general superintendent of the Northern district of the same road. He was promoted to general superintendent in March, 1898, and in February, 1900, was made general manager of the same road. In October, 1905, he was elected president of the Pacific Railway, which was incorporated to build the Washington section of the Chicago, Milwaukee & St. Paul extension to the Pacific coast, and in January, 1909, became president of its successor, the Chicago, Milwaukee & Puget Sound, which position he held until his election on January 1, 1913, as vice-president of the Chicago, Milwaukee & St. Paul, with office at Seattle, Wash., at the time the C. M. &



H. R. Williams.

P. S. was taken over as the Puget Sound Lines of the Chicago, Milwaukee & St. Paul. Mr. Williams' headquarters have now been transferred to New York, as above noted.

E. H. Fitzhugh, president of the Central Vermont, resigned that position on January 23, and also resigned from the board of directors. Mr. Fitzhugh was born February 1, 1853, at



E. H. Fitzhugh.

Danville, Montgomery county, Mo. He began railway work in 1873 as a clerk in the office of the master car builder of the St. Louis, Kansas City & Northern, now a part of the Wabash, at St. Louis. After serving in the car accountant's office of the same company he was made chief clerk to the superintendent of the Western division of the Wabash, remaining in that position until 1889, when he became master of transportation for the lines west of the Mississippi river on the Wabash at Moberly. In January, 1896, he was appointed secretary to the general manager of

the Grand Trunk at Montreal, Que., and the following July was made superintendent of the Middle division at Toronto, Ont. From May, 1899, to March, 1901, he was vice-president and general manager of the Central Vermont. He was appointed assistant to the president of the Southern Pacific in May, 1901, at San Francisco, Cal., remaining in that position until November of the same year. The following February he returned to the Central Vermont as vice-president and general manager, and on January 1, 1905, was elected third vice-president of the Grand Trunk, and also retained his office of vice-president of the Central Vermont. In January, 1910, he was elected first vice-president of the Grand Trunk, retaining also the vice-presidency of the Central Vermont, as well as the vice-presidency of the Detroit & Toledo Shore Line. In the latter part of 1911, he was elected president of the Central Vermont Railway, the Central Vermont Transportation Company, the Southern New England Railroad Corporation, the Southern New England Railway and the Montreal & Southern Counties Railway, at which time he relinquished his duties in connection with his former position to devote his time to the companies named. Mr. Fitzhugh was the chief coadjutor of the late Charles M. Hays in the extension of the Grant Trunk system into New England; and, as will be seen from the foregoing, he had been associated with Mr. Hays throughout his railroad career. It is understood that differences of opinion in regard to the Southern New England extensions have been a principal cause leading to Mr. Fitzhugh's retirement.

Operating Officers.

A. E. Brown has been appointed trainmaster of the Southern Pacific, with headquarters at Roseville, Cal., succeeding J. W. Knightlinger, promoted.

J. A. Barker, road foreman of engines of the Chesapeake & Ohio of Indiana, has been appointed trainmaster, with headquarters at Boston, Ind.

S. B. Moore has been appointed trainmaster of the Missouri, Kansas & Texas, with office at Waco, Tex., in place of Y. M. Martin, resigned.

Robert J. Berry has been appointed inspector of transportation of the Louisiana Lines of the Southern Pacific, with headquarters at New Orleans, La.

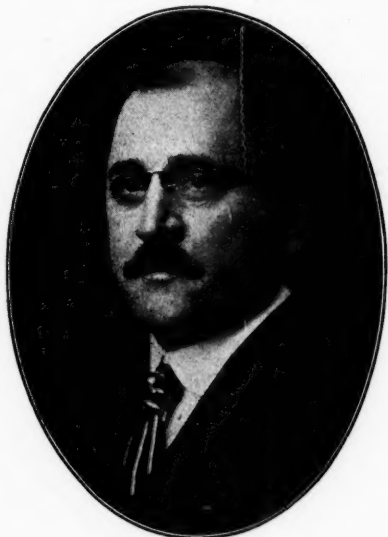
W. B. Allen, trainmaster of the Chesapeake & Ohio of Indiana, at Peru, Ind., has been appointed inspector of transportation, with headquarters at Peru.

J. T. Haralson has been appointed an assistant superintend-

ent of the Sonora division of the Southern Pacific of Mexico, with headquarters at Empalme, Sonora, Mexico.

Evert C. Blundell, assistant division superintendent of the Chicago, St. Paul, Minneapolis & Omaha at Eau Claire, Wis., has been appointed superintendent of the Nebraska division, with headquarters at Omaha, Neb., in place of J. R. Welch, who has been promoted to superintendent of the Minnesota & Iowa division, with office at St. James, Minn., succeeding F. E. Nicoles, promoted.

Edward T. Whiter, whose appointment as general superintendent of the Northwest System of the Pennsylvania Lines West of Pittsburgh, has been announced in these columns, was



E. T. Whiter.

born on March 26, 1864, at Steubenville, Ohio. He was educated in the public schools of Steubenville, and began railway work March 1, 1881, as a telegraph operator for the Pennsylvania Lines. He continued in that capacity until May, 1885, when he was promoted to train despatcher, where he remained until July 1896. On the latter date he was appointed assistant trainmaster, and later he was advanced to trainmaster, which position he held until January, 1903. He was then made superintendent, and was in charge of the Eastern division of the Northwest system

at the time of his recent promotion to the position of general superintendent of the latter system, with headquarters at Pittsburgh, Pa. Mr. Whiter has been continuously in the service of the Pennsylvania Lines since March, 1881.

Samuel H. Charles, who, on January 15, was appointed superintendent of the Oklahoma district of the Missouri, Kansas & Texas, with headquarters at Oklahoma City, Okla., as already announced, was born on February 2, 1869, at Berryville, Ark. He began railway work in December, 1884, as a messenger for the St. Louis & San Francisco, and in July of that year was advanced to telegraph operator, which position he held until August, 1890. He was then train despatcher and chief despatcher until March, 1900, and from the latter date to September, 1907, was trainmaster and assistant superintendent, when he was made superintendent. He resigned February 1, 1912, to go with the Missouri, Kansas & Texas as trainmaster at Parsons, Kan., from which position he is now promoted to that of superintendent of the Oklahoma district, as above noted.

L. A. Boyd, whose appointment as superintendent of the Raleigh, Charlotte & Southern, with headquarters at Biscoe, N. C., has been announced in these columns, was born on June 6, 1850, in Wayne county, Ind., and was educated at Alliance College, Alliance, Ohio. He began railway work in November, 1868, on the Pennsylvania Lines West of Pittsburgh as a telegraph operator at Pittsburgh. He was then despatcher at Denison, Ohio, until 1873; train despatcher on the Little Miami division of the same road until 1880, and trainmaster on the Kentucky Central, now a part of the Louisville & Nashville until 1884. He was subsequently trainmaster and superintendent of the Indianapolis, Decatur & Western, now a part of the Cincinnati, Hamilton & Dayton, until 1892; and trainmaster on the Southern Railway and the Seaboard Air Line until 1906. His next position was superintendent until 1907, of the Northern Adirondack, now a part of the New York & Ottawa. From 1907 to 1912 he was general manager of the Raleigh & Charleston, and then was general manager of the Augusta Northern, which position he held at the time of his recent appointment as superintendent of the Raleigh, Charlotte & Southern, as above noted.

W. S. Wilson, trainmaster of the Grand Trunk at Stratford, Ont., has been appointed superintendent of transportation of the

Ontario lines, with office at Toronto, Ont. P. J. Lynch, superintendent at Allandale, has been appointed superintendent of the Barrie division, with office at Allandale, including districts Nos. 11, 12 and 14. W. R. Davidson, trainmaster at London, has been appointed superintendent of the London division, with office at London, including district No. 17—(Sarnia tunnel to Hamilton and Petrolia branch); district No. 18—(Komoka to Glencoe); district No. 19—(Glencoe to Kingscourt Junction) district Nos. 20, 21 and 24. C. Forrester, trainmaster at Stratford, has been appointed superintendent of the Stratford division, with office at Stratford, including districts Nos. 15, 22 and 23. J. H. Gordon has been appointed superintendent of the Hamilton division, with office at Hamilton, including districts Nos. 13 and 16; district No. 17—(Hamilton to Niagara Falls); district No. 19—(Port Dalhousie to Port Robinson and Welland Junction to Port Colborne. G. A. Stokes has been appointed superintendent of the Toronto terminals. The office of master of transportation has been abolished. The following have been appointed trainmasters: W. J. Durkin, in charge of the 17th district (Sarnia tunnel to Hamilton, including Petrolia branch), 18th district (Komoka to Glencoe), 19th district (Glencoe to Kingscourt Junction), and 24th district, with office at London. R. H. Fish, in charge of the 20th and 21st districts, with office at Brantford. William Hall, in charge of the 13th and 16th districts, 17th district (Hamilton to Niagara Falls), 19th district (Port Dalhousie to Port Robinson and Welland Junction to Port Colborne), with office at Hamilton. C. J. McKeough, in charge of the 15th district, with office at Stratford. Walter White, in charge of the 22nd and 23rd districts, with office at Palmerston, and W. Culligan has been appointed chief despatcher at Stratford, and F. A. Rutherford has been appointed chief despatcher at London.

Miles Bronson, superintendent of the Electric division of the New York Central & Hudson River at New York, has been appointed also manager of the Grand Central Terminal, with



M. Bronson.

headquarters at New York, succeeding to the duties of A. R. Whaley, who has resigned the position of general manager, as noted elsewhere. Mr. Bronson was born on May 8, 1875, in the village of Gauhati, province of Assam, British India. He began railway work in June, 1890, in the law department of the Grand Trunk, at Detroit, Mich., and held various positions with that company until May, 1895, when he became secretary to S. R. Callaway, president of the New York, Chicago & St. Louis at Cleveland, Ohio. In 1897 he was appointed superintendent of the Buffalo Terminal,

which was then under construction. Before the road was opened for business, however, Mr. Callaway went to New York to succeed C. M. Depew as president of the New York Central & Hudson River, and Mr. Bronson became his secretary at New York, instead of going to Buffalo. He was later made assistant to the president. In November, 1900, he was appointed superintendent of the Harlem division, and in March, 1907, he was transferred to the River division; and in January, 1910, was promoted to the Mohawk division. In April, 1911, he was appointed superintendent of the electric division, and now becomes also manager of the Grand Central Terminal, as noted above.

Traffic Officers.

J. S. McKinnon has been appointed traveling freight agent of the Baltimore & Ohio, with headquarters at Atlanta, Ga.

R. B. Herrington has been appointed traveling freight agent of the Traders Despatch Fast Freight Line, with headquarters at St. Louis, Mo.

E. A. Ackley has been appointed freight soliciting agent of the Southern, with office at Savannah, Ga., succeeding J. C. Hext, promoted.

C. B. Sipes has been appointed traveling freight agent of the Baltimore & Ohio, with headquarters at Columbus, Ohio, succeeding Howard L. Galleher, promoted.

William Carruthers, district freight agent of the Oregon-Washington Railroad & Navigation Company at Tacoma, Wash., has been appointed district freight and passenger agent, in charge of all traffic business between Tacoma and Vancouver, with headquarters at Tacoma.

R. D. Miller, commercial agent of the Southern, at Winston-Salem, N. C., has been appointed commercial agent at Anniston, Ala., succeeding W. G. Crutchfield, resigned to engage in other business. G. N. Lawson has been appointed commercial agent, with office at Winston-Salem, succeeding Mr. Miller.

James Edgar Davenport, division passenger agent of the Louisville & Nashville, with headquarters at St. Louis, Mo., has been appointed assistant general passenger agent of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with office at St. Louis, effective February 1. Mr. Davenport was born at Salem, Ill., where he began railway work as a telegraph operator for the Ohio & Mississippi, now a part of the Baltimore & Ohio Southwestern. Later he was agent for that road at Lebanon, Ill., and then went to St. Louis, Mo., as city passenger and ticket agent for the St. Louis Southwestern. Subsequently he was district passenger agent of the Toledo, St. Louis & Western; traveling passenger agent of the Choctaw, Oklahoma & Gulf, and city passenger agent of the Louisville & Nashville at St. Louis, until January 1, 1901, when he became division passenger agent of the latter road.

J. G. Hollenbeck, whose appointment as general passenger agent of the Missouri Pacific and the St. Louis, Iron Mountain & Southern has been announced in these columns, began railway service in 1895 as ticket agent of the Indiana, Decatur & Western at Indianapolis, Ind., and later became traveling passenger agent for the same road. In 1899 he became chief clerk in the passenger department of the Florida East Coast at St. Augustine, Fla., and two years later was appointed district passenger agent of the Louisville & Nashville at Atlanta, Ga. He was subsequently division passenger agent at the latter place until 1907, when he was made general agent of the passenger department of the Missouri Pacific and the St. Louis, Iron Mountain & Southern, with

headquarters at Cincinnati, Ohio. He remained in that position for 18 months and was then promoted to assistant general passenger agent at Little Rock, Ark., which position he held on January 1 when he was appointed general passenger agent, with headquarters at St. Louis, Mo.

Engineering and Rolling Stock Officers.

George O. Hammond has been appointed assistant to the mechanical superintendent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn.

E. E. Finley has been appointed superintendent of maintenance of way of the San Antonio & Aransas Pass, with headquarters at Yoakum, Tex., succeeding Hans Helland, resigned.

The jurisdiction of W. J. Tollerton, general mechanical superintendent of the Rock Island Lines, with headquarters at Chicago, extends also over the St. Paul & Kansas City Short Line.

J. E. Osmer has been appointed superintendent of motive power and machinery and master car builder of the Ann Arbor Railroad and Steamship Lines, with office at Owosso, Mich., succeeding G. E. Coutant, resigned.

F. T. Chase has been appointed master mechanic of the Smithville district of the Missouri, Kansas & Texas Railway of Texas, with headquarters at Smithville, Tex. J. H. Dougherty has been appointed acting master mechanic of the Waco district of that road and the Texas Central, with office at Waco, Tex.

M. J. McCarthy, whose appointment as superintendent of motive power of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton, with headquarters at Cincinnati, has been announced in these columns, was born at Susquehanna, Pa., in 1868. He served an apprenticeship with the Erie Railroad at Susquehanna, leaving that road in 1889. Subsequently he worked in various railroad shops in the West and Southwest as a machinist and foreman. He was with the Chicago, Burlington & Quincy at Burlington, Ia., for 10 years as machinist, inspector and general foreman; four years as division master mechanic of the Michigan Central at St. Thomas, Ont.; two years as division master mechanic of the Lake Shore & Michigan Southern at Elkhart, Ind.; 3½ years as superintendent of shops of the Cleveland, Cincinnati, Chicago & St. Louis at Beech Grove, Ind., and assistant superintendent of motive power of the latter road at Indianapolis, Ind., for 18 months. He held the latter position at the time of his appointment as superintendent of motive power of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton, as noted above.

James Brattell Randall, whose appointment as master mechanic of the Louisville, Henderson & St. Louis, with headquarters at Cloverport, Ky., has been announced in these columns, was born on January 8, 1861, at Athens, Ohio. He received a college education, and on November 12, 1879, began railway work with the Pittsburgh, Fort Wayne & Chicago, now a part of the Pennsylvania Company, remaining with that road for five years when he went to the Indiana, Bloomington & Western, now a part of the Cleveland, Cincinnati, Chicago & St. Louis. He was then chief engineer of stations for four years with the Parkersburg Electric Light & Power Company, and later for one year was in the service of the Newport News & Mississippi Valley. On



J. B. Randall.

December 11, 1891, he became an engineman on the Louisville, Henderson & St. Louis, and on September 6, 1910, was promoted to assistant master mechanic, which position he held at the time of his recent appointment as master mechanic of the same road, as above noted.

W. W. Colpitts has resigned as chief engineer for the receivers of the Kansas City, Mexico & Orient, to become associated with the firm of W. H. Coverdale & Co., consulting engineers, New York City. He will, however, retain his position as chief engineer for the receivers of the company's lines in Mexico. Mr. Colpitts was graduated from McGill University in 1899, with the degree of B.S., C.E., and in 1901 received the degree of M.S. from the same university. He began railway service in 1890 as a draftsman in the office of the chief engineer of the Intercolonial Railway. He filled various positions in the engineering departments of Canadian roads until 1898. During the latter year he was resident engineer of the Midland Railway of Nova Scotia; in 1899 he was chief clerk in the office of the president of the Canadian Pacific at Montreal, and in 1900 be-

came assistant engineer in the construction department of that road. In 1901 Mr. Colpitts went to the Kansas City, Mexico & Orient as assistant engineer; was successively division engineer and assistant chief engineer until March, 1909, when he was appointed chief engineer.

Purchasing Officers.

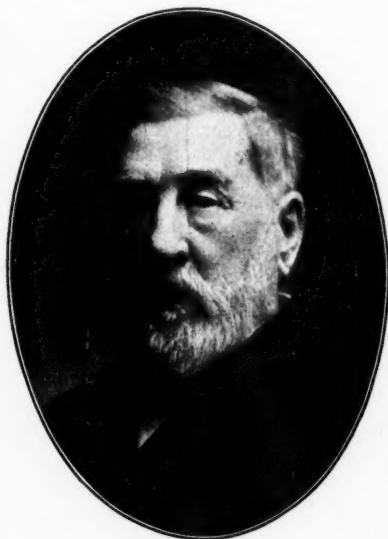
U. K. Hall has been appointed general storekeeper of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Oregon, succeeding J. E. Mahaney, resigned.

OBITUARY.

Edward Reese, roadmaster of the Chicago, Milwaukee & St. Paul, at Savanna, Ill., died on January 13, aged 62 years.

J. McGie, superintendent of the Oklahoma division of the Chicago, Rock Island & Pacific, with headquarters at El Reno, Okla., died at El Reno on Friday, January 24, at the age of 48 years.

Gaylord M. Beach, formerly special agent of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., died on January 1, at Crafton. He was born on July 10, 1831, at Mansfield,



G. M. Beach.

Ohio, and began railway work in 1850 as a laborer on track work on the Sandusky, Mansfield & Newark, now a part of the Baltimore & Ohio. From 1852 to September, 1857, he was in the engineering department of a number of roads, including the Bellefontaine & Indiana, the Erie, and lines now forming part of the Southern Railway. He was subsequently conductor on freight and passenger trains, then fuel agent, and later assistant roadmaster of the Cleveland, Columbus, Cincinnati & Indianapolis, and from June, 1869, to November, 1870, was superintendent of construction of the Indianapolis & St. Louis. Both of these roads are now a part of the Cleveland, Cincinnati, Chicago & St. Louis. In November and December, 1870, he was roadmaster on the Atlantic & Pacific, and the South Pacific, and then for eight years was real estate and tax agent of the Cleveland, Columbus, Cincinnati & Indianapolis. From December, 1878, to March, 1880, he was roadmaster, then to September, 1885, was in charge of the engineering department of the same road, and from October, 1882, to 1885 was in charge also of the engineering department of the Indianapolis & St. Louis. He was then for two months assistant general manager, and from October, 1885, to June, 1889, was general manager of these roads, and vice-president and general manager of the Dayton & Union. In June, 1889, he was appointed general manager of the Chicago & Atlantic, now part of the Erie, and from May, 1890, to January, 1898, was general superintendent of the Pittsburgh & Lake Erie and leased lines. He was then for one year assistant general manager, and from January, 1900, was special agent of the same road at Pittsburgh, Pa., until his retirement under the pension rules of the company on February 1, 1911.

PRIZES OFFERED IN GERMANY.—The German Society of Mechanical Engineers offers a prize of \$375 for the best treatise on annoying noises caused by city and street railways, their causes, and the best means of avoiding them; also similar prizes for a work on the heating of cars by steam, for one on cranes used in locomotive shops, and one of \$500 for an investigation of car-springs, with designs and formulae. The formulae heretofore used are believed to be inadequate.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE SEABOARD AIR LINE is in the market for two Pacific type locomotives.

THE ERIE has ordered 10 Pacific type locomotives from the American Locomotive Company.

THE MICHIGAN CENTRAL has ordered 15 switching locomotives from the American Locomotive Company.

THE ATLANTA, BIRMINGHAM & ATLANTIC is said to be making inquiries for 5 locomotives. This item has not been confirmed.

AMSINCK & COMPANY, New York, have ordered 2 consolidation locomotives from the Baldwin Locomotive Works. These locomotives are for the Sabana Railway, Colombia.

THE DULUTH, SOUTH SHORE & ATLANTIC has ordered 12 consolidation locomotives and 3 Pacific type locomotives from the American Locomotive Company. The consolidation locomotives will have 21 in. x 30 in. cylinders, 55 in. driving wheels, and in working order will weigh 182,000 lbs. The Pacific type locomotives will have 21 in. x 26 in. cylinders, 67 in. driving wheels, and in working order will weigh 193,000 lbs. All of these locomotives will be equipped with superheaters.

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 30 superheater Pacific type locomotives and 30 six-wheel switching locomotives from the American Locomotive Company and 25 mikado locomotives from the Baldwin Locomotive Works. The Pacific type locomotives will have 27-in. x 28-in. cylinders, 79-in. driving wheels, and in working order will weigh 291,000 lbs. The switching locomotives will have 21-in. x 28-in. cylinders, 57-in. driving wheels, and in working order will weigh 165,000 lbs.

CAR BUILDING.

THE ILLINOIS CENTRAL has ordered 1,000 gondola cars from the Pullman Company.

THE HARRIMAN LINES have ordered 800 work cars from the Bettendorf Axle Company.

THE CHESAPEAKE & OHIO has ordered 2 postal cars from the Pressed Steel Car Company.

THE DENVER & SALT LAKE is negotiating with the American Car & Foundry Company for 100 box cars and 20 stock cars.

THE AMERICAN REFRIGERATOR TRANSIT has ordered 1,000 additional refrigerator cars from the American Car & Foundry Company.

THE PENNSYLVANIA RAILROAD is in the market for 5,000 all-steel gondola cars, 1,300 wooden-side gondola cars and 1,000 refrigerator cars.

THE FT. DODGE, DES MOINES & SOUTHERN is said to have ordered 200 box cars from the Lenoir Car Works. This item has not been confirmed.

THE PENNSYLVANIA LINES WEST are in the market for 3,000 all-steel gondola cars, 1,000 wooden-side gondola cars, 500 refrigerator cars and 500 box cars.

THE SOUTH BUFFALO has ordered 30 hopper cars from the Summers Steel Car Company. These cars will be built by the Standard Steel Car Company.

THE WHEELING & LAKE ERIE has ordered 1,000 coal cars from the Standard Steel Car Company, and 500 coal cars from the American Car & Foundry Company.

THE ALIQUIPPA & SOUTHERN has ordered 20 hopper cars from the Summers Steel Car Company. These cars will be built by the Standard Steel Car Company.

THE SOUTHERN RAILWAY has ordered 200 box cars from the American Car & Foundry Company, and 100 gondola cars and 50 hopper cars from the Cambria Steel Company.

THE LOUISVILLE & NASHVILLE, mentioned in an unconfirmed item in the *Railway Age Gazette* of January 24, as being in the market for 500 gondola cars, is in the market for that equipment.

Supply Trade News.

J. B. Rider, general manager of the Pressed Steel Car Company, Pittsburgh, Pa., has been made a director of that company.

The Carbon Steel Company, New York, has moved its general offices from 30 Church street, to the Cameron building, New York.

Frank F. Fowle has resigned his position with the McGraw Publishing Company as one of the editors of the *Electrical World*, with office in New York, and has opened offices at 68 Maiden lane, New York, as consulting electrical engineer.

J. L. Stark, who has been general inspector of the car department of the Hocking Valley at Columbus, Ohio, has resigned to become a representative of the Chicago-Cleveland Car Roofing Company, with office at Chicago. Mr. Stark is president of the Chief Interchange Car Inspectors' & Car Foremen's Association of America.

Gilbert H. Pearsall resigned as secretary of Joseph T. Ryerson & Son, in charge of railroad sales, with headquarters in New York City, on January 1, to engage in business for himself. Edward T. Hendee, who has been assistant to the president of the company, has assumed the duties heretofore devolving upon Mr. Pearsall.

TRADE PUBLICATIONS.

METAL ROOFING.—The American Sheet & Tin Plate Company has published a small booklet entitled *Better Buildings*, which gives information relative to the uses and advantages of formed metal roofing and siding materials.

UNIONS.—The Jefferson Union Company, Lexington, Mass., has published an attractive illustrated folder in which it gives a brief sketch of the life and work of George Washington and discusses the construction and advantages of Jefferson unions.

METAL SAWS.—The Vulcan Engineering Sales Company, Chicago, has published a well illustrated catalog of its metal saws, including cold metal sawing machines, combination saw and rotary planers, cold saws, foundry saws, etc. Concise descriptions and dimensions are included.

TOOL STEEL.—The Firth-Sterling Steel Company, McKeesport, Pa., has published a small booklet entitled *Which Do You Believe*, the object of which is to show that even very small increases in production justify paying much more than a 50 per cent. increase in the first cost of tool steel. The booklet is really a brief description of the relation of tool steel prices to manufacturing costs.

ELECTRICITY IN EXCAVATION AND CONSTRUCTION WORK.—The General Electric Company, Schenectady, N. Y., has just issued an interesting bulletin (No. A4080) devoted to the use of "Electricity in Excavation and Construction Work." The bulletin deals with both the generating of the current and its use through motors. It touches on the advantages to be derived from the use of electric power, and refers briefly to its application to the work in connection with the Panama Canal, Catskill Aqueduct, New York Barge Canal, and in general building construction.

SOUTH AUSTRALIAN RAILWAYS.—Railways were early in starting in South Australia, the first one, between Adelaide and Port Adelaide, being opened in 1856, with the Victorian gage of 5 ft. 3 in., which was continued on the main lines connecting with Victoria, and extending northwards from Adelaide as far as Terowie. Later the state was induced to adopt the 3 ft. 6 in. gage; hence, of the total mileage of 1,676 miles given in the last report, 835 were on the smaller gage. Unlike New South Wales and Victoria, the lines converge on several ports apart from the Capital. The average cost of the South Australian lines, which contain no very remarkable engineering difficulties of construction, amounts to \$43,485 per mile. The lines authorized or in progress amount to 103 miles on the broad and 186 on the narrow gage.

Railway Construction.

ALTON, ST. LOUIS & CAIRO (Electric).—An officer of this company, which was organized to build from Alton, Ill., south along the east bank of the Mississippi river to Cairo, 175 miles, writes that the line will be practically level, and will connect with several lines which now terminate at the Mississippi river. Steam will be used for the motive power for freight, and motor cars for passenger, mail and express service. Of the first 50 miles to be built from East St. Louis, Ill., to East St. Genevieve, 40 miles has been graded and only a little bridging and trestle work remains to be done. It is expected that contracts for track laying on this section will be let soon. The company expects to eventually extend the line to New Orleans. Thomas N. Chase is president, St. Louis. (January 17, p. 131.)

ALTOONA-NORTHERN (Electric).—Under this name work of transforming the old Wopsononock railroad, which will extend from Altoona, Pa., to Patton, Cambria county, 20 miles, has been started. The "Wopsy" road was built 22 years ago from Altoona to Dougherty, 14 miles, to tap a coal field. Last year control of the property was secured by Sigmund Morris, and the new company was formed to build an eight-mile extension and electrify the entire road, also to change it to standard gage. The Altoona-Northern has a capital of \$750,000.

BEAUMONT & GREAT NORTHERN.—See Missouri, Kansas & Texas.

CHARLESTON-ISLE OF PALMS TRACTION.—An officer writes that contracts are to be let about July 1, to build an extension of the line now in operation from Mt. Pleasant, S. C., east to Isle of Palms, 9 miles, from the latter place east to McClellanville, about 27 miles. The company also operates a 3 mile ferry line to the city of Charleston. Contracts are also to be let at the same time for an extension from the northern terminus at Mt. Pleasant northeast to the Cooper river, and for building a reinforced concrete bridge over the Cooper river 5,000 ft. long, thence to the terminus in the city of Charleston. James Sottile is president, and W. W. Fuller, chief engineer, New Charleston Hotel, Charleston. (November 22, p. 1013.)

CLACKAMAS SOUTHERN.—An officer writes that contracts for bridge work have been given to the Interstate Contract Company, Portland, Ore., and all other work is being carried out by the company. No additional contracts will be let for work on the line building from Oregon City, Ore., south via Beaver Creek, Mulino, Molalla and Monitor to Mt. Angel, 32 miles. Track has been laid on 6,500 ft., and the company expects to have tracklaying finished to Molalla, 19 miles, by August 1, and to Mt. Angel by December, 1913. The work involves handling from 5,000 to 8,000 cu. yds. a mile, of which 85 per cent. is earth and 15 per cent. loose rock, and there remains about 17 miles yet to be graded. The maximum grades will be 2 per cent., and the maximum curvature 15 deg. The company expects to develop a traffic in lumber, logs and farm products. It is the intention of the company to use steam as the motive power for the present, and to electrify the line within two years. Frank Busch, president, and J. L. Stacer, chief engineer, Oregon City.

GREAT FALLS & TETON COUNTY.—See Great Northern.

GREAT NORTHERN.—An officer writes that the Great Falls & Teton County is being built from Power, Mont., west and northwest to Choteau, about 30 miles. No contracts have been let to build an extension from Choteau to Bynum. (October 18, p. 774.)

KENTUCKY SOUTHWESTERN ELECTRIC RAILWAY LIGHT AND POWER COMPANY.—Announcement has been made that this company, which was organized some time ago to build from Paducah, Ky., south to Mayfield, thence to Murray, about 45 miles, will start work on the line early this year. It is understood that the entire right of way has been secured. H. T. Rhodes, president, and W. A. Calhoun, consulting engineer, Paducah. (September 20, p. 559.)

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—This company has definitely decided upon a plan to extend its present lines by constructing about 725 miles of heavy, standard road through Montana. This northwestern extension is to connect

with the Canadian Pacific system at a point near the extreme edge of the Montana-Idaho border. Other plans of the company include building 30 miles from Plaza, N. Dak., to the Missouri river, and an extension of the Ambrose line, 80 miles into Montana. This work, definitely decided upon some months ago, will be gone ahead with. (January 3, p. 38.)

MISSOURI, KANSAS & TEXAS.—An officer writes that surveys are now being made from Waco, Tex., southeast to the Beaumont & Great Northern at Weldon, also from this line at Livingston southeast towards Beaumont. The company recently bought the Beaumont & Great Northern, extending from Livingston northwest via Trinity to Weldon.

MOBERLY, HUNTSVILLE & RANDOLPH SPRINGS (Electric).—An officer writes that contracts are to be let in April to build from Moberly, Mo., west via Huntsville to Randolph Springs, 12 miles. The plans include putting up two or three small steel bridges, a power house and terminals. C. H. Dameron, president, and J. J. Munindger, chief engineer, Huntville. (January 3, p. 38.)

MOBILE & BALDWIN COUNTIES (Electric).—Incorporated in Alabama with \$50,000 capital, to build from Mobile, Ala., northeast to Bay Minette, about 25 miles, and eventually to extend the line southeast to Pensacola, Fla., an additional 50 miles. W. B. Miller, Chicago; J. P. Lowell, and M. H. Miller, Mobile, and J. R. Cross, Fairhope, Ala., are directors.

MONTEZUMA & WESTERN.—An officer writes that contracts are to be let this spring to build from a connection with the Colorado & Southern at Silver Plume, Colo., west via Montezuma to the Colorado & Southern at Keystone. The plans call for building 39 miles of narrow gage line. The total excavation will be about 690,000 cu. yds., of which 190,000 will be rock work. The maximum grades will be 3 per cent., and maximum curvature 25 deg. There will be 3,400 lineal feet of trestles and 7,600 ft. of tunnels. About one-half mile of track has been laid and about one-half mile of tunnel work has been completed. The company expects to develop a traffic in ore, timber and mining equipment. A. J. Woodruff, general manager; C. A. Hopkins, chief engineer, 707 Equitable building, Denver. (December 20, p. 1235.)

MONTOUR RAILROAD.—Contracts it is said will be let before the opening of spring to build extensions to connect with the Bessemer & Lake Erie near Homestead, Pa., about 40 miles. (November 29, p. 1053.)

NEW YORK CENTRAL & HUDSON RIVER.—Extensive improvements are now in progress at Rome, N. Y., consisting of the relocation of the main line through the city; the construction of a new passenger station, and the enlargement of the freight facilities, also the elimination of all grade crossings within the limits of the new line. This line is to be a cut-off three and a half miles long, and is being built about three-quarters of a mile south of the present location. The relocation is made necessary by the new barge canal, which crosses the old line both east and west of the city. The relocated line is parallel to and just south of the barge canal. The new line is to have six tracks, two more than at present. The R. W. & O., which now joins the main line just west of the passenger station will connect with the new line at the west end of the relocation, and cross the barge canal on an independent bridge. All highway undercrossings are to be reinforced concrete arches with spans varying from 35 to 45 ft. The freight yard will lie to the north of the new line just west of the point where it diverges from the old, and will have 16 yard tracks of about 4,500 ft. each, providing a total capacity of 1,760 cars, while a portion of the old line is retained with a new bridge over the barge canal as an industrial connection to the present yard and freight facilities. The new passenger station will be a two story brick structure 40 ft. x 210 ft., located about opposite the present station, with the second floor at the track level and a 16 ft. passenger subway having a baggage elevator and two stairways to each of the three outer platforms, access to the inner one being direct from the station. The total cost is estimated at about \$2,000,000, and the work is being done by the M. A. Talbot Co., of Philadelphia, Pa., and Rome, N. Y. It is expected that the improvements will be finished during 1913.

NEW YORK ROADS.—The New York Public Service Commission, First district, will open bids on February 7, for the con-

struction of Section No. 3 of the Woodside, Astoria and Corona rapid transit railroad. This section embraces the Corona branch, running from the Queens end of the Queensboro bridge out Queens boulevard, Greenpoint avenue and Roosevelt avenue to Sycamore avenue, Corona. It is to be a two and three-track elevated line. Bids for the construction of Section No. 2, the branch from the Queensboro bridge to Ditmars avenue, Astoria, were opened on January 28. (January 24, p. 191.)

OIL BELT OF ILLINOIS (Electric).—This company, which operates a line between Bridgeport, Ill., and Oblong, 25 miles, will issue bonds. Part of the proceeds of the bonds are to be used for future betterments and improvements. The line is now being extended 80 miles, to complete a through line from Charleston south to Mt. Carmel, 105 miles, through the oil belt, traversing Coles, Cumberland, Crawford, Clark, Lawrence and Wabash counties. W. E. Finley, president, and T. M. Mooney, secretary and treasurer, Bridgeport. (November 15, p. 973.)

OKLAHOMA ROAD.—According to press reports surveys have been made to build from Sapulpa, Okla., west to Cushing, about 40 miles. Former Governor Charles M. Haskell, is back of the project.

OMAHA, LINCOLN & BEATRICE (Electric).—An officer of this company, which operates a 6½ mile line from Lincoln, Neb., to University Place and Bethany Heights, writes that permission has been asked to issue bonds and stock to secure funds for building an extension of about 50 miles. The plans call for building northeast via Waverly, Greenwood, Ashland, Springfield, Papillion and South Omaha to Omaha.

PENNSYLVANIA RAILROAD.—An officer writes that bids are being asked for piercing three tunnels on the Allegheny division as follows: Tunnel at East Brady, Pa., to be 2,660 ft. long, will effect a saving in distance of 5.7/10 miles over the existing line; tunnel at Wood Hill, 2,870 ft. long, will effect a saving of 5 5/10 miles, and the third tunnel at Kennerdell, 3,350 ft., will effect a saving of 4 miles. (January 17, p. 132.)

PLATEAU VALLEY.—Organized in Colorado to build from Yeckel Junction, Colo., which is on the Denver & Rio Grande, near Grand Junction, east to Collbran, about 40 miles. It is understood that construction work will be started soon. Jacob Yeckel, president, and A. J. Halter, vice-president.

ROCK ISLAND, STUTTGART & SOUTHERN.—Incorporated in Arkansas with \$300,000, to build from Mesa, Ark., south to Stuttgart, 22 miles. T. S. Bugbee, president; A. B. Copley, vice-president, and G. B. Pugh, secretary and treasurer.

SOUTHERN RAILWAY.—This company will let contracts soon for the construction of double track north from Monroe, Va., the southern terminus of the Washington division, to Amherst, eight miles. Contracts will also be let for the construction of double track from Twenty-seventh street, Birmingham, Ala., to the east end of the North Birmingham yard.

TIDEWATER SOUTHERN (Electric).—An officer writes that work is now under way to complete the line from Stockton, Cal., to Turlock, 50 miles. Contracts for this work were let about a year ago to the Daae Construction Company, Sacramento, Cal. Track has been laid on about 40.5 miles. There will be two steel bridges each about 240 ft. long, and about 2,000 ft. of trestle. J. H. Wallace, chief engineer, Stockton. (May 24, p. 1181.)

WESTERN MARYLAND.—All passing tracks are to be extended to 4,000 ft. clear length, and the construction of five additional passing tracks of the same length has been authorized on the 80-mile section between Hagerstown, Md., and Cumberland. This involves the construction of about 7½ miles of track at a cost of from \$250,000 to \$300,000.

WOPSONONOCK.—See Altoona-Northern.

NEW LINE FOR INDIA.—The Indian railway board has accorded its sanction to a survey being carried out by the Bombay, Baroda & Central India Railway for a line on the 5 ft. 6 in. gage from Gangapur, on the Nagda-Wertha section of the Bombay, Baroda & Central India Railway, to Luni, on the Jodhpur-Bikaner Railway, a distance of about 260 miles.

Railway Financial News.

ATLANTIC COAST LINE.—The New York Stock Exchange has authorized to be listed on and after February 3 the \$6,250,500 common stock which was recently offered to the stockholders at par, making the total amount to be listed \$71,241,800. The proceeds of the sale of this stock will be used as follows: \$6,210,000 will be paid for the company's subscription to the increased stock of the Louisville & Nashville; and \$40,500 for additions and improvements.

BOSTON & MAINE.—J. P. Morgan & Co., New York, Lee Higginson & Co., Boston, and F. S. Mosely & Co., Boston, are offering at 100¼ the unsold portion of \$10,000,000 5 per cent., one year, coupon notes dated February 3, 1913. The proceeds will be used as follows: About \$5,000,000 to pay for Maine Central stock; and a part of the balance to take up small note issues maturing before June.

CANADIAN NORTHERN.—See Canadian Northern Alberta.

CANADIAN NORTHERN ALBERTA.—There has been deposited in the office of the Secretary of State of Canada a trust mortgage, dated November 29, 1912, made by the Canadian Northern Alberta to the British Empire Trust Company, Ltd., the National Trust Company, Ltd., and his Majesty the King and the Canadian Northern Railway securing 3½ per cent. 50-year debenture stock, guaranteed by the Dominion of Canada.

CENTRAL VERMONT.—E. A. Chittenden has been elected a member of the executive committee, and E. T. Smith has been elected a director, both succeeding E. H. Fitzhugh, resigned.

CHICAGO, MILWAUKEE & ST. PAUL.—Stockholders of record February 6, will be permitted to subscribe at par, not later than February 28, when payment must be made in full, for \$13,957,400 4½ per cent. convertible bonds of 1912, up to 6 per cent. of their holdings. These bonds are part of an authorized issue of \$50,000,000 and are of the same character as the \$34,893,500 which were offered to shareholders last spring, as mentioned in the *Railway Age Gazette* of April 12, 1912. Kuhn, Loeb & Co. and the National City Bank, both of New York, have, it is said, underwritten the bonds. These bonds will mature June 1, 1932, but may be converted at par into common stock after June 1, 1917, and before June 1, 1922.

H. R. Williams, vice-president of this company, has been made also a director.

DULUTH, MISSABE & NORTHERN.—This company has called for payment, February 1, at the Central Trust Company, New York, at 105 and interest, \$155,000 first consolidated mortgage bonds dated January 1, 1893.

GRAND TRUNK PACIFIC BRANCH LINES COMPANY.—The Grand Trunk announced in London on January 10 that it was authorized to receive subscriptions at 94 for the following bonds of this company; £240,700 (\$1,203,500) 4 per cent. sterling bonds, due 1939, principal and interest unconditionally guaranteed by the government of the province of Saskatchewan; £238,600 (\$1,193,000) 4 per cent. sterling bonds, due 1942, principal and interest unconditionally guaranteed by the government of the province of Alberta. The proceeds will be used for the construction in the provinces of Saskatchewan and Alberta of branch lines which will be operated under agreement by the Grand Trunk Pacific.

MARYLAND & PENNSYLVANIA.—Baker, Watts & Company, Baltimore, Md., has purchased an issue of \$50,000 5 per cent. equipment bonds.

MEXICO NORTH WESTERN.—The holders of the 5 per cent. 50-year first mortgage bonds and the 6 per cent. cumulative convertible income bonds will vote on February 12 on the question of authorizing not more than £2,500,000 (\$12,500,000) 15-year prior lien 6 per cent. bonds secured by a prior lien on the entire property. The directors have approved of this issue and suggest that enough of these bonds be sold to pay off the existing floating debt, approximately \$5,500,000; to meet the coupons on the first mortgage bonds coming due next March, which amount to about \$700,000; and also to provide for the general purposes of the company.

NEW YORK CENTRAL & HUDSON RIVER.—The New York Public Service Commission, Second district, has given its consent to the lease of the New York & Ottawa Railroad to the New York Central & Hudson River for a term of one year commencing February 1, 1913. It has been the practice of the commission to consent to the renewal of this lease from year to year.

NORTHERN PACIFIC.—The New York Stock Exchange has listed \$1,084,000 prior lien 4 per cent. bonds, due January 1, 1997, the proceeds of which were used for part of the cost of double track, making the total listed \$109,152,500.

OLD COLONY RAILROAD.—This company, which is leased by the New York, New Haven & Hartford, has sold at auction, through R. L. Day & Co., Boston, Mass., \$630,000 stock at \$176 per share.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—The directors who were elected last spring to serve temporarily pending the execution of the company's \$200,000,000 mortgage, have resigned, and the board now consists of the following: George J. Gould, chairman; B. F. Bush, president; Finley J. Shepard, assistant to the president; James Speyer, Edgar L. Marston, E. T. Jeffery, E. C. Simmons, J. G. Metcalfe, Albert H. Wiggin, Jay Gould, Edwin G. Merrill, O. L. Garrison and C. A. Pratt. A new executive committee was also elected, composed of George J. Gould, chairman; B. F. Bush, Albert H. Wiggin, E. T. Jeffery, James Speyer, Edgar L. Marston and Finley J. Shepard.

SCOTT CITY NORTHERN.—It is understood that the securities of this company, consisting of \$825,000 first mortgage bonds and \$415,780 stock were purchased at auction by the Commonwealth Trust Company, St. Louis, and allied interests.

SOUTHERN RAILWAY.—This company has sold to J. P. Morgan & Co., New York, \$5,000,000 five per cent. 3-year notes dated February 1, 1913, the proceeds of which are to be used, together with other funds, to pay at maturity the \$10,000,000 three-year notes which mature on February 1, 1913. The bankers now offer the holders of these maturing notes to exchange them at par for the new 3-year notes at 99¾.

IMPORTANT CHINESE RAILWAY COMPLETED.—The railway from Tientsin, the port of Peking, south by east 674 miles to Pukow, on the Yang-tse-Kiang opposite Nanking, was completed in December when the great bridge over the Hoang-ho was finished. The northern 425 miles were built by Germans, the southern 249 by English. The Chinese government purposes to work the road on its own account. This completes rail connection from Peking to Shanghai, except for the crossing of the Yang-tse-Kiang.

CONSTRUCTION IN ASIA MINOR.—December 21 a section some 30 miles long of the Bagdad Railway was opened in the Taurus mountains, and not long before a longer section of the same line was completed east of these mountains. There is some very heavy work to be completed in the mountains before the two sections can be connected. This work is near the northeast corner of the Mediterranean sea, which will be reached by a branch line to Alexandretta. It may be supposed that the Turks have other work than railway building to occupy them at the present time; but the enterprise is in the hands of Germans and others, while of course there has been profound peace in Asia Minor.

INDIAN RAILWAY POLICY.—The present policy of improving existing lines prior to making new extensions is justified by past experience. Opening a settled and thickly populated country such as India by railways is a very different enterprise to opening new countries. In the latter, population and cultivation follow the railway, and traffic grows slowly with the development of the country, so that the resources of the line are not suddenly taxed, but grow gradually with the traffic requirements. It is different in India, where the country pierced is often rich and railway facilities are taken advantage of fully from the opening of the line. Much of the complaints about insufficient arrangements for traffic are due to this feature. The call on the new lines is so great that the older lines even become congested with the rapidly increased traffic. In new countries this would not happen; growth of traffic would be more gradual.